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*A nine year old planting of *Phyllostachys bambusoides* (Timber Bamboo) showing new culms, at Avery Island, La*

Bamboo Growing for the South

F. A. McITHEENY

The growing of bamboo in the warmer sections of the United States, where the climate is moist, and the land rich, should be one of the major agricultural pursuits; for bamboo wood is adaptable to very many uses, from building houses to conversion into paper, and due to its rapid growth and heavy yield per acre, is destined to replace to a large extent the native timber of the South.

Bamboo not only grows well in the bottom lands that will produce good crops of sugar-cane, sorghum, corn, and similar crops, but is far more remunerative per acre over a long term of years than any crop which can be grown on such lands.

Prior to World War 2, all bamboo used in the United States and Europe was imported from the Orient. Since this trade has been cut off by lack of shipping space, there has been a great shortage of bamboo and bamboo material, and the supply of this valuable wood has dwindled to nothing.

Bamboo may be divided roughly into two types: those which develop the new growth from underground root stalks or rhizomes (these spread rapidly), and those which grow in compact clumps and which spread slowly.

A good many years ago I, in association with the Division of Plant Exploration and Introduction of the U. S. Department of Agriculture, became interested in trial plantings of bamboo at Avery Island, Louisiana.

The first planting made here consisted of five varieties of the running type belonging to the *Phyllostachys* group, and two varieties of the bunch bamboo belonging to the *Dendrocalamus* group. These plantings were put

in for me by Dr. H. F. Schultz of the Division of Plant Exploration and Introduction in April 1910. By careful attention, all of the *Phyllostachys* group thrived and increased rapidly. The two plantings of *Dendrocalamus* were not hardy, and could not withstand our winter cold, as they made their growth in the late summer and were still soft when freezing weather came on, while the *Phyllostachys* group made their growth in the early spring (late March and April) and the culms were fully matured before the Fall.

All of the *Dendrocalamus* are what as known as "bunch growing" bamboos, while the *Phyllostachys* group and the varieties closely allied to it are rhizomatus in their growth, the new growth developing from strong underground roots radiating from the parent plant parallel to the surface of the ground. The rhizomes, which make their growth during mid-summer and early Fall, are heavy, short-jointed underground runners, often branching underground. At irregular intervals along these runners or rhizomes are eyes from which the new stalk or culm springs when the warm weather of Spring arrives.

The bud from which the new bamboo culm is to grow appears on the side of the rhizome as a small, hard swelling, composed of overlapping sheaths. As the warm weather of Spring comes on, this bud begins to lengthen, and the sheath bases begin to draw away from one another, and the bud expands into a compact upright growth until its point pierces the ground. These sheaths fit over each other like the shucks over an ear of corn, and the elongation takes place

very much in the same manner as when a telescope is withdrawn section by section.

The new culm first makes its appearance above ground as a sharp point, and develops slowly upward for the first few days after its appearance. An interesting feature of the bamboo's growth is that the entire length of the cane is compressed into the sprout when it first makes its appearance above ground, the elongation being from the bottom up; that is, the bottom joints or internodes elongate much more rapidly than those above, and only slow down and cease growing when they have reached the length to which nature intended they should grow. There is no increase in the girth of the bamboo culm after it appears above ground, but the culm elongates joint by joint until it reaches its maximum height. This elongation becomes more rapid as the culm gets higher; is slow for the first two or three feet, but the growth from then on is exceedingly rapid in height until maturity is reached. The timber bamboo, for instance, when growing from mature rhizomes, makes its complete growth, which may be as much as fifty-five feet, in six weeks; and this is about the average time in which all bamboo shoots reach maximum height.

According to my observation, bamboo is the fastest growing plant known. A culm of *Phyllostachys bambusoides* or *Phyllostachys edulis* that will measure four inches through at the base will make an average growth in a normal season of 18 inches in twenty-four hours, attaining its greatest growth during the warm part of the day. Maximum growth, of course, depends not only on proper temperature, but the proper amount of moisture in the atmosphere and in the ground, and a suitable amount of plant food to produce normal growth.

The varieties of bamboo which can be grown satisfactorily in the area bordering the Atlantic Ocean from Savannah south, and extending all along the Gulf Coast inland to the point where the temperature in March does not drop below a couple of degrees of ice, are many. I have growing in my experimental gardens in Louisiana sixty-four varieties that are entirely hardy, and which have never been hurt by temperatures that frequently reach 15 degrees Fahrenheit. Some of these varieties are of the giant type, reaching a height of sixty feet or more, and suitable for many uses in construction where timber of moderate strength is used, other varieties are small in stature, some reaching a height not exceeding 12 inches, but making such a compact ground cover and spreading so rapidly that their foliage which is green and succulent all winter furnishes a wonderful winter pasture for live stock.

In growing the *Phyllostachys* group of bamboos, it is advisable to cultivate the land deeply for one summer previous to setting out the plants. The ground should carry a cover-crop of some leguminous vegetation during the summer, all of which should be plowed under deeply in the Fall.

The planting is best set out in rows eight feet apart, not later than February 1st, in order that they may become well established before the spring growth starts in March. The earth between the rows should be kept clean throughout the first summer by frequent shallow cultivations or planted with a cover-crop between the rows of some sort of clover or other low-growing legume, which will not shade the bamboo plants themselves, but will keep the ground mellow and free from weeds and grass, and save cultivation.

If the season has been satisfactory for root growth, the rhizomes from the plants put down in February, from



Timber Bamboo (Phyllostachys bambusoides) ten years old, at Avery Island, Louisiana.

which the new plants are to sprout, should completely tie across the eight foot rows by the first of August. There will be little or no new growth during the first spring, unless there are some

strong rhizomes on which there are growing buds on the plants when they are set out, but the following Spring; that is, one year after the initial planting, there will be a thick growth of

young culms possibly completely covering the space planted. When this growth has been accomplished, no other cultivation is necessary, but if there should be patches of weeds that have come up along the new shoots, they should be cut out, and in late February or early March a liberal application of Nitrate of Soda at the rate of not less than 300 lbs. to the acre be broadcast and lightly raked in. Bamboo, being a giant grass, is a rank feeder, and Nitrate is very necessary for its satisfactory development.

Other than the application of Nitrate, a fertilizer composed of:

- 3 parts Superphosphate
- 1 part Ammonium Sulphate
- 1 part Calcium Sulphate

should be broadcast and raked into the ground three times during the year. The first application should be in February, the next in April, and the last in June. If this system of fertilization is followed, bamboo will not only grow rapidly, but will attain its maximum size in a very much shorter time than if it is allowed to develop only from the natural fertility of the soil.

The third year after the bamboo plants are set, a fairly liberal cutting can be made of canes measuring $\frac{3}{4}$ of an inch at the base and less, suitable for small fishing poles, plant-stakes and other uses where a small cane is required. Not more than one-third of the standing canes should be cut in any year, as a cutting greater than this will reduce the next spring's growth, and tend to reduce the size of the new canes. By experience, I have learned if more than one-third of a stand of bamboo is cut in any one year, considerable damage is done to those left standing, and succeeding growth is scanty. Also, if the young immature canes are cut, sap will flow from the cut butts and great damage be done

to the rhizomes from which the cut growth grew.

If the bamboo planting is handled in the manner herein prescribed, (referring, of course, to the *Phyllostachys* group), the maximum size culms; that is, canes with a diameter of three to four inches and larger, and a height of forty-five to sixty-five feet may be expected. It is safer, however, not to expect canes of this size under ten or twelve years of careful growth management. From that time on, however, the bamboo planting will produce maximum canes yearly, without limit, until the planting has reached an age of thirty years or more, then inflorescence begins and seed develops. This stage will continue for two or three years, after which the entire planting will die, but new culms will arise from the outside rhizomes which can be used for planting new areas. It is of interest to state here that the very considerable planting which I made on Avery Island in April 1910 has not yet gone to seed, and has been producing each year a maximum number of culms.

It is also of interest to note that if the land surrounding the *Phyllostachys* bamboo forest is plowed in winter, and a good bed of loose soil is produced for ten to twelve feet outside of the borders of the planting, the entire area will be filled with new rhizomes by the first of August and the bamboo planting will be increased by this area yearly.

The foregoing comments have dealt with the *Phyllostachys* Bamboos, as this group are by far the most valuable for general use, but the *Bambusas* or clump-forming bamboos are many and very well adapted for growing in the South, and for some uses are equal in value to the rhizomatus types.

Clump bamboo develops from the original plant by shoots from the base of the original plant, and this growth



Twelve year old plants of Bambusa argentea and Bambusa argentea striata, growing at Avery Island, Louisiana.

is about equal from all sides, so that there is built up a compact bunch of culms growing much more closely together than those of the running type. The uses for the bunch type of bamboo

are almost as varied as are the running type uses, but the individual canes do not grow as large.

The extremely rapid growth of bamboo and its many uses make it a "must"



Phyllostachys edulis, showing new culms. Planting nine years old.

for the areas of the South where it will grow satisfactorily.

Bamboo is destined to take the place of Southern Pine for the production of paper, as it is rapid in its growth, and its growth is continuous year by year, and although the canes do not reach

full hardness and durability until their third year of growth, if scientifically cut, a bamboo forest will produce more pulpwood per acre per year than any other plant known.

Avery Island, La.

Nov. 15, 1944.

The Story of *Camellia Reticulata*

ROBERT CASAMAJOR

While visiting the garden of Victor Reiter, Jr., in San Francisco in April 1942, I noticed a gorgeous flower on a small shrub in the distance and on inquiring what it was Mr. Reiter informed me that it was *Camellia reticulata*. Although I had heard of this rare plant for years, I had never seen it, and the foliage is so different from the familiar *C. japonica* that I would never have recognized it as a camellia.

Naturally, I immediately wanted to own a plant, and on finding it could not be secured from Mr. Reiter, I tried elsewhere, only to discover that it just wasn't for sale anywhere. This fact rather intrigued me, so I began a search, which has led into many places and experiences.

I soon learned that the predominant cause of its scarcity was the fact that no one has been able to get it to strike roots from a cutting, though much wood has been lost in the attempt. Therefore it must be propagated by grafts and even these are tricky, compared to *C. japonica*.

I further found a great atmosphere of secrecy about it, wherever I inquired, and although several people owned it, they just didn't talk about it and much less want to show it to you.

It soon became apparent that nearly all of the existing plants in California were raised from scions secured from a large plant growing in the Botanic Gardens at the University of California in Berkeley. Therefore it seemed proper that if I wanted to learn more of *C. reticulata* I had better start there. While my visit profited me very little in the line of information, I at least saw a magnificent specimen, carefully housed, in a lath house, under lock and key. I would estimate this plant

to be ten feet high and six feet across and when I saw it in December 1943, I guess it had at least 400 nice fat flower buds on it. I was a bit amazed, however, when no one there could tell me where the plant had been secured. This was disappointing because I had hoped its history and habitat would be on record.

It was hinted to me, however, that there was doubt as to it being a true species and further doubt as to whether it had ever made viable pollen, or fully developed stigmas.

One interesting fact was offered from the University and that was, that when the plant was small it produced larger flowers than it has done in later years and I was told that some blooms exceeded nine inches in diameter.

My search next led me to the Huntington Library in San Marino, California, and there with the assistance of William Hertrich, Curator of the Huntington Botanic Garden, and some articles on the subject collected by Mrs. Carlo Galli of South Pasadena, California, the story gradually unfolded.

It appears from the record that in 1820 a Captain Richard Rawes brought to England, in his East India Merchantman, a plant of a fine *Camellia*, which he secured in Canton, China and gave it to his friend Thomas Carey Palmer of Bromley, Kent. Mr. Palmer grew it in his conservatory and it bloomed in the Spring of 1826. It was given the name of Captain Rawes *Camellia* and in the Botanical Register of July 1, 1827, No. 1078, Vol. XIII, it was identified by John Lindley, an English Botanist, as *Camellia reticulata*. In describing the plant he said: "We conceive there can be no doubt of this being specifically distinct from

C. japonica, from which it is distinguished by its rigid, flat strongly reticulated leaves, and also by its silky ovary. The flowers also have a different aspect, the petals are much undulated, and irregularly and loosely arranged, with none of the compactness and regularity for which *C. japonica* is so much admired.

"The *C. reticulata* has the habit of *C. japonica*. The leaves are rigid, oblong, acuminate at each end, serrated, flat, not shining, and reticulated with deeply sunken veins. Flowers very large, bright clear purple, with the appearance of a Peony. Calyx imbricated, 5 leaved, more or less stained with purple. Petals 17-18 somewhat repand, wavy, generally entire, loosely arranged. Stamens much shorter than the petals, at the base irregularly monadelphous in several rows, the minor ones rather separate from the others, they are often divided into several bundles, which are placed opposite the inner petals. Ovary roundish, silky, 4-celled, with several distichous ovules. Style, 4-fld smooth. Stigmata simple. The style is occasionally 2 or 3-fld, and the ovary 2 or 3-celled."

After this careful description he goes on at great length to make his point that it is a new species and says that although one of the fundamental qualifications of a species is that it will reproduce itself when self-pollinized he still considers this plant to be a distinct species. While he does not say that this plant did not set seed, he does imply that it had not done so.

The color plate accompanying this description was not drawn from the plant brought in by Captain Rawes, and bloomed by Palmer, but from another plant owned by the Royal Horticultural Society brought to England in 1824 by John Dampier Parks in his East Indianan, the Lowther Castle.

Five months later the Curtis Botanical Magazine on December 1, 1827, No. 2784, published another color plate of *C. reticulata* and this one was from a drawing by Miss Curtis of Captain Rawes' plant. In telling about the flower Mr. Curtis says: "Not having myself had the opportunity of seeing the plant I adopt Mr. Lindley's suggestion of its being a new species," and he then quotes the Lindley description given above.

In this color plate there are drawings of a seed capsule and section, and seeds alone, but a note says this: "Representations of capsule and section are from the Warratah Camellia (t. 1654) and seeds from the single red (t. 42)." So that once again we have the implication that the plant did not set seed, else its own seed and capsule would have been shown and not that of another plant.

A comparison of these two color plates shows that the Captain Rawes Camellia in the Botanical Magazine is six inches in diameter and a clear rose pink color, while the plate in the Botanical Register is five inches in diameter, and a trifle darker. The form of the two flowers is apparently the same.

The next reference found was in Paxton's Magazine of Botany, ten years later, in Vol. 3, 1836-37, Page 101, which shows a color plate with a flower 7½ inches in diameter and very similar in form and color to the plate in Botanical Magazine of December 1, 1827, No. 2784. There is no new information in the accompanying article however.

We then move ahead twenty years to April 1, 1857 and in the Botanical Magazine, No. 4976 there is shown a plate of *C. reticulata flore-pleno*, a double form, and quite different from the earlier drawings. This plant was



Captain Reeves' Camellia, identified by John Lindley in 1827 as *Camellia reticulata*. Plate 2784, Curtis *Botanical Magazine* 1827.

sent to England by Robert Fortune, a Scotch botanist, who had been sent to China by the Royal Horticultural Society to collect plants, and it is believed that he secured it from a man by the name of Reeves, who was in the employ of the East India Company in

Canton and used to gather choice plants from the gardens of Canton and send them to England by the various sea-captains, who came to the port. There is no evidence that he did any collecting of plants or seeds in their native haunts. It therefore appears that the

so-called double form of *C. reticulata* is either a natural or horticultural hybrid.

A comparison of this color plate with one published by Verschaffelt, of which Mrs. Verne O. McCaskill of Pasadena, California, has a copy, and to whom I am indebted for a view of it, indicates that the two were probably made from flowers from the same plant. In one, the flower is 5 inches across and the other 5½ inches, but the form is identical. It has about twice as many petals as the one brought in by Captain Rawes, is more formal, imbricated and shows the stamens prominently. The edges of some of the petals fade to nearly white.

In the article, in the Botanical Magazine, accompanying this drawing, is a story of a fine plant of Captain Rawes' Camellia growing in the conservatory of William Byam Martin, Bank Grove, near Kingston, Surrey, which was 13 feet high, 16 feet spread, and had a circumference of 50 feet. For the health of the plant in October 1848, it was necessary to remove 2,600 buds, and when it bloomed in April 1849, it had 2,000 flowers, each one 8 inches across.

We now jump nearly 80 years to the Botanical Magazine of May 13, 1935 t. 9397 to find after 108 years that Captain Rawes' Camellia was not the true species of *C. reticulata* at all and that John Lindley was probably in error in identifying it as the true species.

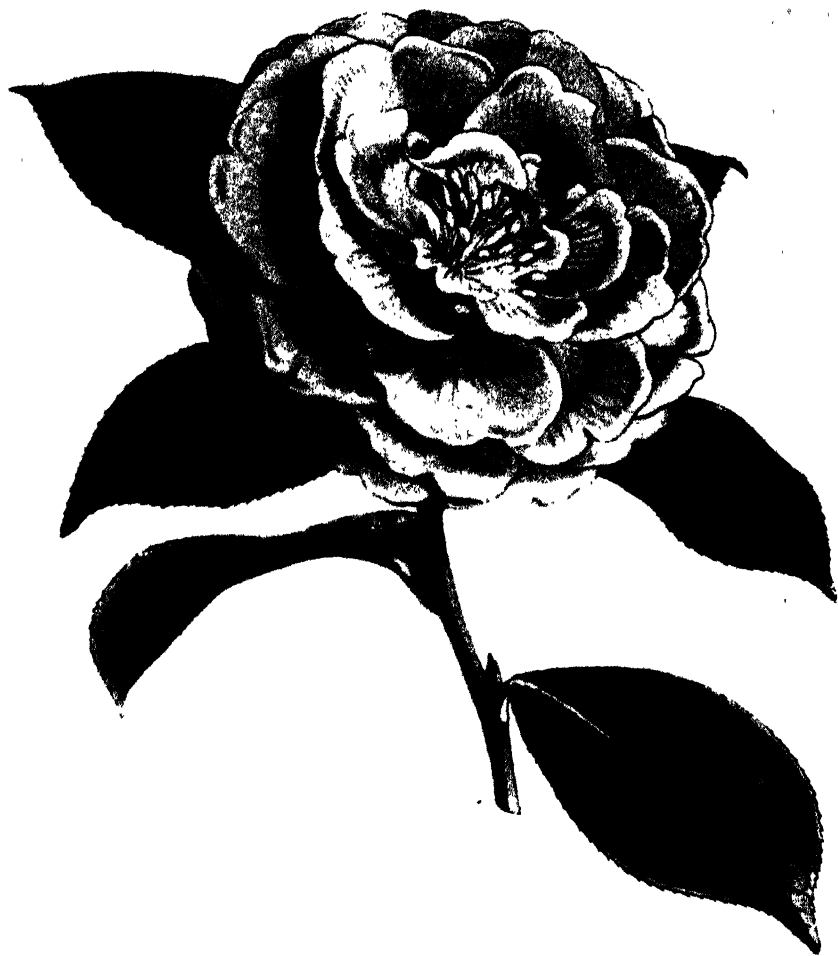
Botanical Magazine in the above numbered color-plate and accompanying article states: "For more than a century the species has been known only in the double or semi-double flowered garden form and until 1912 no wild material had ever been collected that could be definitely connected with the garden form.

"In March 1932, Mr. J. C. Williams

of Caerhays Castle, Cornwall, sent us specimens of a Camellia raised from seed collected by Forrest (No. 25352), which had just come into flower with him, and from this material the present plate was prepared. The plant was grown under the name *C. speciosa*, but there is not the slightest doubt that it is really *C. reticulata*, and examination of Forrest's field specimens, in the Kew Herbarium, reveal a number of sheets, which the late Dr. O. Stapf was able to identify with *C. reticulata*. All were obtained in the hills around Tengyueh (Western Yunnan), where Forrest found the plant growing in scrub, thickets and open pine forest at altitudes of 1830-2750 meters. He first collected it in 1912 (Nos. 7662, 9305), and subsequently in 1913 (No. 9715), 1924 (No. 25352) and 1925 (No. 27165), and sent home seed from which plants have been raised. Thus, after more than a hundred years, the wild form of the species has at last been discovered and introduced into cultivation."

It is described as a tree up to 10.5 meters high, loosely branched with greyish bark, and the flower as having 5 or 6 petals. In the plate, however, there are apparently 10 petals and the open flower is 3½ inches across. The color is a clear rose showing many stamens. The description further states that the flowers appear singly on the twigs in the axils of the uppermost leaves. This is also a characteristic of the plant at the University of California.

Victor Reiter, Jr., has informed me that the specimen at the University was one of four, which were imported by Golden Gate Park, from Hillier & Sons of Winchester, England, of which he received one and the Park kept two, which were later lost. He also stated that he has another plant that he se-



Camellia reticulata flore-pleno. The double form sent to England by Robert Fortune from Canton, China. Plate 4976, *Botanical Magazine* 1857.

cured from Canada, the flower of which is identical with the original one.

George Petersen of Chico, California, informed me that he had a plant in bud that was killed by the cold spell in 1933, so it was apparently more tender than *C. japonica*. His stock was se-

cured from the University of California.

If the drawing and colors of Captain Rawes Camellia, as shown in the *Botanical Magazine*, are correct, it seems apparent that the plant at the University in Berkeley and now com-

ing into circulation throughout the State of California as *C. reticulata* is identical with the specimen brought to England in 1820.

While it is true that this plant has the characteristics that distinguish *C. reticulata*, as grown from Forrest's seed (No. 25352), it also is apparent that the flowers of the two plants are different, the Captain Rawes Camellia being easily twice as large as the wild species, and more double. This would indicate that the former is a hybrid, in which one side of the cross is *C. reticulata*, or a primary hybrid of it. Hybrid vigor would thus account for the great improvement in size. There is also the possibility that it could be a mutation or "sport" of the species though this seems less likely than the hybrid theory.

At any event it is a magnificent Camellia and well worth owning if you can find some way to secure it. Botanical Magazine in 1935 says this of the species. "*C. reticulata* is quite the finest of all the Camellias and is easily recognizable by its very large rose-red flowers and large elliptic leaves with a dull upper surface and the venation clearly visible in the living state."

So far as I can learn the wild species, as collected by Forrest near the town of Tengyueh, is not now growing in the United States of America and Camellia growers would do well to attempt to secure it as well as the allied species *C. Pitardii*. If the blood of these two Camellias could be introduced into hybrids with that of several of our present fine varieties of *C. japonica* an entirely new race of fine flowers might result.

In view of the foregoing facts it appears that it is really improper nomenclature to call the plant which is now in cultivation in California *C. reticulata* and it could more properly

be designated as "Captain Rawes" or possibly "*C. reticulata* var. Captain Rawes."

When selecting a root stock on which to graft scions of this variety it is advisable to use a strong vigorous grower as there is considerable evidence that the top growth is far more vigorous than most *C. japonica* varieties and there is a possibility that this may be the reason why the University of California plant did not have such large flowers as it grew in size, in spite of the fact that it was fertilized regularly. In other words the root action did not keep pace with the top growth. It would be interesting to try it on the wild species of *C. reticulata* itself, if seeds could be obtained. Since this tree grows to 32 feet it should have a strong root system. That this fact was observed many years ago is evidenced by an article in an old copy of the "Gardeners Chronicle," of London, to which Mr. Hertrich called my attention, in which the writer deplored the fact that some way could not be found to get it to grow on its own roots.

Mr. O. E. Hopper of Oakland, California, has informed me that he has a plant of *C. reticulata* which he secured from Robert Veitch in Surrey, but a color-plate, that he sent me of a flower from it, looks to me quite different in color and form from the one at the University of California.

In any event there appear to be several flower forms from plants, which have the characteristic leaf of *C. reticulata*, as well as its habit of making but one growth a year, and that the color and number of petals is in considerable variance. Until someone has had an opportunity to observe several of them growing under the same conditions, along with the wild species as collected by Forrest, it will be difficult to clarify the nomenclature for this monarch of all the Camellias.



Camellia reticulata. The wild species grown in England from seed collected by Forrest near Tengyueh, in western Yunnan, China. Plate 9397, Curtis Botanical Magazine, 1935. By special permission of The Royal Horticultural Society, 1944.

Lateral Inflorescences in the Bromeliaceae

MULFORD B. FOSTER

It has been generally accepted that most of the bromeliads send forth their inflorescences from the center of the main axis of the plant. The exceptions to this generalization have provided some interesting data on this subject.

One of the early known exceptions is in the epiphytic rosette type of bromeliad in the genus *Quesnelia* of the subfamily Bromelioideae. In this genus the species, *lateralis* has long been known to bloom laterally, as noted in Harms* (1930), "Occasionally an otherwise normally vegetatively shortened shoot forms bracts and blossoms. Such accidental formations (according to Mez, p.x.) are not rare in *Quesnelia lateralis* Wawra . . ."

My observations from the living material convince me that such formations are neither accidental nor rare in *Quesnelia lateralis* although this condition is abnormal to the genus.

In 1940 my first observation of an epiphytic bromeliad sending forth its inflorescence laterally was made when I took *Quesnelia lateralis* in the Organo Mountains above Therezopolis in Brazil. I was very much surprised to find this same species also blooming from the center. I immediately examined many of these epiphytic bromeliads growing in clusters on rocks, and in the trees, and found just as many of the plants blooming from the base, (at a point below all of the leaves) as well as from the center of the main axis in the tube of the rosette. Later I learned from Dr. Lyman B. Smith, bromeliad specialist of Harvard, that this *Quesnelia* was originally named *lateralis* and at a later time also named *centralis*. At the time botanists evidently thought that they were two different species.

*Harms' translation by Dr. Lyman B. Smith

When this phenomenon of a duplex blooming habit was recognized in the one species, the species name, *Q. centralis*, was placed in synonymy. After having this plant in cultivation four years, I have now observed that *Quesnelia lateralis* not only blooms laterally from the base, but the same plant blooms also from the center of the main axis. The lateral inflorescence appears first, and then about two months later another inflorescence may appear from the center of the same rosette.

This condition of lateral inflorescence is rarely found in bromeliads although Harms says, "another type of development can be seen in the case of *T. complanata*, and *T. multicaulis* (caespitosa) because here, after the blossoms of the main axis, new blossoming bracteate sprouts arise from the axils of the rosette leaves."

The caulescent habit of a number of the *Tillandsias* such as *T. pulchella*, *T. stricta*, *T. firmula*, *T. decomposita* and others gives the plants the appearance of having lateral inflorescences. These plants when not in flower may show several old dried inflorescences emerging laterally from the stem, not unlike the large rosette type of *D. microcalyx* as explained below. I have found the large rootless plants of *T. decomposita* with as many as ten old scape stubs protruding laterally from the twisted main stem but as in all this type of *Tillandsia* the new inflorescence appears in the main axis of the plant, to be later pushed aside when new axis leaf growth starts again.

It is not difficult to understand how such plants as these caulescent *Tillandsias* could have been described as having lateral inflorescences.



Quesnelia lateralis. Unusual bromeliad with a regular "freak" habit of blooming laterally from the base as well as from the center of the plant.

In considering further this phenomenon of lateral inflorescence Harms said: "Rarely the main axis regularly remains sterile and the inflorescences arise from the axils of the rosette-leaves. This is the case for example in *Greigia sphacelata* (R.&P.) Regel."

Another lateral inflorescence which is noticeable upon first examination is

in the *Disteganthus basilateralis* which like *Greigia* and *Quesnelia* is in the subfamily Bromelioideae. Harms made only a notation of this peculiar condition: "In *Disteganthus* the axis arises laterally from the rhizome (Plagianthae C. Koch in Wochenschr., f. Gaertner: III [1860])." My examination of the plate of *Disteganthus basilateralis* Le-



Tillandsia decomposita with its many old scape stubs protruding laterally from the twisted main stem shows the new inflorescence appearing from the main axis of the plant. The caulescent stem often becomes over two feet in length. This fantastic tree-top epiphyte dispenses with roots, using its curly leaves in an octopus-like grasp to hold it in secure position.

maire in Fl. des Serres iii tab. 227 (1847) shows me that several inflorescences emerge simultaneously out of the base of the plant below the rosette.

While I have found at least two inflorescences on one rosette emerging at the same time from certain species of *Dyckias*, I know of no other bromeliads where this multiple inflorescence occurs regularly as a characteristic, except as noted above. Although in freak plants, having a central inflorescence, of *Aechmea Orlandiana* and *Wittmackia lingulata* I have found more than one scape emerging from the center axis of the rosette.

The genera, so far unrecorded as

regularly producing a lateral inflorescence are in the subfamily Pitcairnioideae and so far as my observation or any available data shows they are confined to *Hecktia*, *Dyckia*, *Deuterochoinia*, and *Encholirium*. These have, in common, a spiny leaf rosette form generally so similar to each other that it is almost impossible to distinguish one genus from another, even by a close observer if the inflorescence is not showing.

My observations as to the position of inflorescences in these four genera of the Pitcairnioideae group may not be entirely new. That is, Mez in his monograph pictured *Hecktia glome-*



Dyckia frigida. Upper portion of the plant showing position of the inflorescence which emerges from the side of this many leaved rosette.

rata on page 353 and *Dyckia remotiflora*, page 336 with the inflorescence coming from the side but in the same monograph pictured *Hecktia desmetiana*, page 359 with the inflorescence coming from the center with no comment whatsoever as to the position or variance of emergence even in the same genus. In Martius' FLORA BRASILIENSIS, *Dyckia minarum* plate No. 91 was pictured with the inflorescence coming from the side but no significance or association was attached to this condition. Baker, in his Handbook stated in the description of *Hecktia* and *Dyckia* that the peduncle was produced from the axil of one of the outer leaves of the rosette. Thus this may be no announcement of something entirely new, yet it is a recording of the fact that lateral inflorescence is a phenomenon peculiar to certain genera in the Pitcairnioidea whose main axis always remains sterile.

Whereas in *Quesnelia* and *Tillandsia* lateral inflorescence is an exception so far as I know all of the species in *Hecktia*, *Dyckia*, *Deuterocohnia* and *Encholirium* show this lateral characteristic.

It was during August 1939 when we were collecting at Villa Velha in the state of Parana, in south Brazil, that I first observed that the inflorescence of *Dyckia frigida* (Hook. f.) came out of the side of the plant from the axils of the leaves about one quarter of the way between the center of the rosette and the base of the plant. This awakened me to the fact that not all the bromeliads bloomed as a terminal of the center or main axis of the plant. I made a photograph at once and sent this on to the Gray Herbarium with the herbarium material.

After collecting *Hecktias*, in Mexico, *Dyckias*, *Encholiriums* and *Deuterocohnias* in Brazil and noting their habits of flowering, I was quite sur-

prised when Dr. Smith informed me that little had been written about lateral inflorescences in the Bromeliaceae. No doubt this has come about because most of the observations have been made from incomplete or partial herbarium material. The genera *Dyckia*, *Hecktia*, *Encholirium* and *Deuterocohnia* are the kind of plants that almost every botanist shuns when it comes to making herbarium specimens, and it is impossible to get a complete plant of most of the species of these genera (which would show the position of the inflorescence), inside an ordinary sized press. Only a few species of these genera have been grown in cultivation and although observations have been made they evidently have not been correlated.

In the genus *Dyckia* all of the species are caulescent. Although they may vary in their branching habits there is also a variation in the manner of flowering. *Dyckia microcalyx* for example which I found in Matto Grosso growing on rocky ledges, often shoots two spikes, each with several hundred flowers, simultaneously and within three whorls of leaves of each other. I not only observed this in its natural habitat, but I have it before me in my living plants. In two years of growth the rosette of all green leaves shows the 1942 scape, now dead of course, but near the base of the plant. The two 1943 scapes, now dead, are midway in the rosette while the two new 1944 inflorescences well formed, are at a position about one quarter to one eighth of the distance from the crown of the rosette.

Dyckia Fosteriana, on the other hand, blooms mid-way in the rosette, then the plant subdivides into two heads and so on until the ground is covered with a branched, caulescent bed of *Dyckias*. *Dyckia minarum*, *D. coccinea*, *D. simulans* and others have a



Dyckia encholirioides. A plant perhaps 50 years of age showing a branched, yucca-like trunk as it crawls over granite rocks at the edge of the Atlantic in Southern Brazil.

similar growth, but *D. leptostachys* shoots underground stolons and makes a vast coverage of apparently individual plants over quite some area in practically the same manner as *Pseudo-Ananas* and *Bromelia*. In all these *Dyckias* the same rosettes continue to bloom for several years, although in these types they do not form a long continuous caudex as in *D. encholirioides*.

Overlooking the Atlantic in Parana, Brazil and but a few feet above high water, on great granite rocks, I found *Dyckia encholirioides* with an old caudex over six feet in length which certainly must have been not less than 50 years of age. The plant was still vigorously blooming and putting out new roots from the underside of the caudex. *Dyckia ursina* (nov. sp.) also forms a fair sized caudex but its growth is much slower and it is more prone to

branch into several heads as it clings to the rocky crevices.

Dyckia microcalyx like *D. encholirioides* as well as *D. frigida* and *D. ferruginea* also form quite a considerable caudex. These species continue to grow for many years, blooming laterally and forming a single or branched caudex, not unlike a prostrate yucca.

I found the same development and caulescent growth in the *Encholiriums* and *Deuterocohnias*. *Deuterocohnia Meziana* proves to be one of the most fantastic bromeliads I have ever collected. It grows equally well on limestone rock almost at the river's edge, and high on manganese rock in the great pantanal (swamp) of Matto Grosso, and in some instances the plants develop a very long caudex when rock conditions are favorable. However, while this plant sends out lateral inflorescences they do not appear an-



By permission, Jaques Cattell Press

Encholirium horridum (nov. spec.) Showing lateral inflorescence This new species has the distinction of being the only known *Encholirium* with a branched blooming spike.

nually as in the *Dyckias*. This *Deuterocohnia* sends up a branched woody inflorescence four to seven feet in height which blooms over a period of several years. It seems incongruous to find a stiff succulent, spiny rosette form of a monocotyledonous plant that develops an inflorescence which resembles a woody shrub.

I know of no other bromeliad which has the incredible habit of blooming year after year from the same branched inflorescence as does this *Deuterocohnia*, and I know of no other flowering plant with such a habit. After each dry spell or at the beginning of each rainy season new buds swell and break into flower on newly formed branchlets. On one plant I found one old woody stub of a scape half an inch in diam-

eter and but a few inches in length still managing to throw out its new branchlets covered with flowers.

When I made a close examination of the six-foot inflorescence I discovered that under the outer covering of the stem there was a definite layer comparable to the cambium layer which is found in all dicotyledonous plants such as our common woody perennials. This was probably the first discovery of a cambium layer in the Bromeliad family, which is monocotyledonous. The only other recorded instance where such a condition has been noted in a monocotyledon was when, recently, a few species of the Lily family were found to have a similar characteristic.

In conclusion, I feel that my studies of the living plants point out the fact



By permission, Jaques Cattell Press.

Deuterocohnia Meziana. A bromeliad with the fantastic habit of sending out a tall branched lateral inflorescence which has the characteristics of a woody shrub, even a cambium layer; it blossoms from the same inflorescence for a period of several years.

that taxonomic work must not be confined to herbarium material or drawings made from these pressed plants. Very often the artist who makes the final drawings for the plate is not the observer, and therefore may place the inflorescence in the wrong position, change the shape of a plant or picture a number of features without actual knowledge. I believe I am not far wrong in assuming that most botanical drawings are made from preserved herbarium material and I am quite frank to say that the degree of success has been astonishing considering the inert condition of the plants.

When I took my first picture of a lateral inflorescence I hesitated sending the photos and observations to the herbarium. Knowing that *Dyckias* have been collected and described for so many years, I felt that it would be an unnecessary exposure of my own amateur ignorance. But now it has only assured me that all observations should be noted and recorded not only to reveal something new but to correlate the findings of others. Therefore, I feel that for a more complete taxonomic understanding there must and will be a greater effort made to study the living plants.

Length of Blooming Period in Shrubs and Flowering Trees

STANLEY W. LEONARD

The length of time of bloom should be the most important point in deciding which shrubs or trees to plant.

In the North most all of our hardy shrubs and trees bloom only a week or ten days. If it is very hot and dry (especially in the spring) even this brief period is made shorter.

Typical examples of short season bloomers are:

Azaleas (see exception below)
Cornus florida
Cornus mas
Crataegus
Cydonia
 Flowering Cherry
 Flowering Peach
 Flowering Plum (except *P. blairiana*)
Kalmia
Laburnum
Lonicera (except *Lonicera fragrantissima*)
Magnolia (except *Magnolia glauca*)
Malus (in variety)
Philadelphus coronarius
Rhododendron
Rosa hugonis
Rosa spinosissima
 Hybrid Perpetual Roses (exceptions here)
 Most Climbing Roses
Spiraea (Spring flowering types)
Styrax
Syringa (in variety)
 Tree Peony
Viburnum (in variety)

Typical examples of long season bloomers are:

Althea
Amelanchier
Azalea mucronulatum
Buddleia (in variety)
Cercis canadensis

Cornus florida rubra (at first blooms are not very attractive but as season advances they become more beautiful)

Daphne cneorum
Forsythia (in variety)
Franklinia
Hamamelis (in variety)
Hibiscus (mallow marvels)
Hydrangea
Lonicera fragrantissima
Lonicera halleana and climbing types of *Lonicera*
Philadelphus (most French hybrids)
Prunus blairiana
 Roses (Hybrid Teas)
Salix pentandra
Weigela

You may ask wherein lies the value of lists such as these. In a green garden (and many people are planting them now) one should use short season bloomers as accents and long season bloomers in large masses or design a green garden that predominates in short season bloomers but not in too great a variety.

In the case of *Malus* (Flowering Crabs) except for the double varieties like Bechtel, all *Malus* have attractive fruits that last much longer than the blooms. The fruits appear in late summer and early fall.

We definitely lack long season bloomers. It is true we have new *Buddleia* varieties but why couldn't hybridizers give us new and larger *Altheas*. Among Hybrid Tea Roses we have plenty of new varieties and in *Philadelphus*, Lemoine gave us many splendid varieties.

Pittsburgh, Penna.

Some Iris Hindsights

ROBERT E. ALLEN

Characteristic of youth is the desire for independent learning. Some few years ago when I would volunteer to give my son some benefit of what knowledge and experience I had on subjects of current concern to him I would be met firmly with the concession that perhaps I was entirely right but he would not know for certain until he had found out for himself.

By this criterion amateur irisarians must all be deeply imbued with the spirit of youth, for it would be difficult to find a group, unless in the field of philately, in which there is such a penchant for the independent research and investigation of their hobby. However, many of us are reticent, or perhaps diffident, about putting our findings in the written word, for fear that they may sound amateurish or even be wrong. Only the knowledge that many original observations supported by more confirmations are required to secure scientific acceptance of a fact encourages me to make a few observations concerning some of the incidents of my career as an ardent apprentice in irisdom. What to do and what not to do must ever remain the prerogative of the individual irisarian, so, rather than attempt to be didactic or pedagogic, I shall confine my "hindsight" observations to those things relating to iris culture that I would and am now doing differently from the way in which I first attempted them.

Like many another iris lover I first became interested in irises as the result of observing their general durability, persistence and ease of culture. This was during my high school days, just before World War I, when, in moving some of my mother's iris clumps to make room for annuals that I realized

would require more care and attention, I decided to give several bushels of discarded rhizomes a chance to grow on a bare roadside bank. I planted them most hurriedly and carelessly on the sloping clay fill and gave them no care whatever thereafter, but the next summer the bank was colored sparsely and briefly with the conglomerate colors of *I. pallida*, *I. albicans*, *I. variegata* and probably some others. Last summer I saw that roadside planting for the first time since 1921 and those same irises or their descendants are still there blanketing the bank after surviving the storms, weeds neglect and enemies of nearly thirty years. Not far away in a long-deserted yard I also observed clumps of white and purple *Iris kaempferi* that, together with some nearby clumps of peony *officinalis rosae* I know to have been planted in 1900, but that have found soil and moisture conditions to their liking and so are able to still bloom bravely each year despite the choking growth of grass and weeds surrounding them.

Thus I early learned that within reasonable limits the iris has certain fool-proof qualities that appeal to the flower lover. Soon after making this observation I noticed in the advertising pages of the Strand Magazine which at that time was featuring a fiction serial recounting the marvelous time and space permutations of a mystic creature known as the Psammyad, a little advertisement offering a dozen fine new iris originations for one pound. I only remember that the address of the nursery was somewhere in Kent but I do remember that in due course after ordering I received thirteen nicely labeled plants in what I then thought was poor condition. However, they all grew and

all bloomed the next season and were quite an object of interest in the neighborhood because they were obviously so much better than the local irises. As I recall there were three different blues, a red bicolor, a cream, a plicata, two purples, an amoena, two variegatas, a pink blend and a blue-white.

I left the labels on the plants naturally enough, and equally naturally there wasn't a trace of them left the second year and the names were "disremembered." Then and there I learned that if iris are worth planting they are worth knowing and that the only way of keeping a permanent record of iris names and locations is to carefully make and preserve a planting chart, on which all subsequent movements and changes are registered with equal care. Even though two years ago I was sentimental enough to go and collect a specimen of each of the thirteen varieties which are now well distributed through the neighborhood, I have as yet been able to positively identify only Maori King as one of the thirteen. They all look like a bunch of second-rate seedlings and my only reason for collecting them was to have them serve as an illustration of thirty years of iris progress, for almost certainly some of the best modern iris I have in my garden are lineal descendants from some of those old gems of the mauve decade.

So I learned that good charts and records of iris planting are an essential to the real enjoyment of an iris garden. The best labels available may be used to easily identify irises in the garden, but a good planting chart is necessary also because irises have a way of outgrowing their labels and labels have a strange way of moving about and interchanging themselves, particularly if your visitors number among them some practical jokers.

Last season I was somewhat surprised to receive a lot of "rave" comments on Nylon from my visitors. Now Nylon is a fine iris but it had never before attracted such attention. When I next visited my garden I discovered the reason. Some waggish early visitor had interchanged the namesakes of Nylon and Prairie Sunset and the perfectly magnificent display that Prairie Sunset put on in my garden last spring is probably still credited to Nylon in the minds of many unknown visitors. So important do I now consider the subject of charting my plantings that I have two charts of most of my recent plantings—one a work sheet to take into the garden with me and the other a master sheet for the records.

Due to occupational circumstances I have had the opportunity of growing irises in Australia, Canada, several states of this country and, once, when I had no other choice, my iris garden consisted of several window-boxes in a Washington apartment and office. Iris gardening in window boxes is truly a last resort, except for some Asiatic species and their hybrids, and can be recommended only as such, but it does give one a rather intimate insight into the private lives and growing habits of the iris. It supplies convincing proof on how essential sunlight and drainage are for iris health. Rot and leafspot followed me right indoors via soil or plant borne spores I presume. A case of iris fire consumed one fine pink iris rapidly, but did not spread to the other four occupants of the box. In the absence of their natural enemies, aphids tended to run wild but were easily controlled with conventional tobacco-base sprays while the addition of a copper base proprietary controlled the leafspot just as it does in outdoor plantings.

The few diseases and insects that

trouble irises no longer worry me much for iris health is largely a matter of sanitation and prevention, plus attention. Although some plants such as Geum, Heuchera, Echscholtzia, Gypsophila and Asclepias seem fairly compatible with irises, as a general rule I prefer not to interplant companion crops in my iris beds. If a new planting seems somewhat vacant it is because the iris plants themselves are not as close together as they well might be. As far as disease and insect injury is concerned there seems to be a certain safety in numbers, for while the rot or the borer may easily wipe out one rhizome of a choice variety in a day or so, it is unlikely that a group of three or four plants will be completely killed.

So when I do observe bad attacks of leaf spot, mustard seed fungus, and the iris borer, I regard it as my own fault for having slipped on the necessary control measures. In the case of rot where weather conditions and probably other factors as yet unknown about iris metabolism are largely contributory, it is simply a matter of philosophical application of the customary but sometimes heroic remedial measures. Much has been written about the incidence and treatment of rot, but so far as I know there has been no classification of iris varieties into rot resistant, rot tolerant and rot susceptible groups. Nor do I know of any studies made of possible symbiotic relationships of irises and mycorrhiza, or of factors affecting iris metabolism. I think that irises are subject to rot only when their inherent or current resistance becomes low due to organic changes resulting from physical or chemical disturbances to their normal functioning. Be that as it may, rot occurs more frequently with my plicatas than with any other group. Some

varieties I have never seen affected with it, but some other varieties are always the first to succumb.

Some of the most robust iris I have ever seen are growing a few feet down a gravelly hillside from a manure pile back of a Virginia barn. Their growth is lush and so is that of the weeds among them. Some evidence of rot is always present among the several old varieties growing there in abandon, but no wholesale destruction. The bed sweeps around the end of the barn into a low spot where a seepage keeps the ground moist except during drought. Here the iris lead a miserable rot-ridden existence and barely survive. Too much humus and poor drainage seem to be bad as every irisarian thinks he knows. However, as regards manure itself, I use dilute manure water regularly on my iris as well as my other plants as a growth stimulant as soon as a new root system is established after transplanting, and I have never noticed any ill effect other than that the susceptible iris so treated rot just the same as the untreated ones during an extended period of dark days and continuous rain when the temperature and humidity are high and the sunlight poor. So about all I know about rot is that I don't know much and apparently I am in numerous company.

The progress of an iris addict in his chosen subject is both routine and familiar. He is first a spectator, then a novice, then a collector, then a fancier, then a specialist and finally an authority if he lasts that long. At any place along the line he may suddenly fancy himself an iris breeder and this present paper is sad proof that occasionally some otherwise sound junior member develops delusions of authority. In common with most other fanciers I imagine I made every possible error in my search for iris knowledge.

I hate to think of the number of varieties I have bought on the strength of a glowing catalog description or on some naive impulse. I also regret that there is such a bewildering flood of names and misnamed varieties on the market. I admire and applaud the efforts that are being made to curb this flood, but even at its lowest level I am afraid that there will still be more varieties introduced during a five year period than can possibly receive any substantial customer recognition. For example, 369 new names for tall bearded iris alone were registered in 1943. If as many as ten per cent of this number of these new clons of 1943 are catalogued in 1953 it will be something extraordinary in irisdom. It is true that the philatelist and stamp collector is confronted with more new stamp issues each year, but his new stamps do not cost as much on the average as new irises, neither do they require a lot of expensive ground and the cultivation and care that new irises demand.

Of the 20,000 old iris names listed in the official Iris Check List, it is doubtful if as many as 2,000 varieties are today obtainable from dealers. Many others can be obtained by correspondence with their originators but it is surprising how many irises of relatively recent introduction seem to have become extinct already. One hears talk occasionally of an iris clon "running out" and many iris gardens have had cases of apparent reversion or decadence. Although a vegetatively reproduced clon is not supposed to change except as the result of continued adjustment to an environment notably different from that of its origin it seems not unlikely that certain constitutional weaknesses may not manifest themselves for several seasons, during which the succeeding crops of offshoots gradually begin to show the effects of soil

and climate to a greater extent than that of heredity. Every amateur iris breeder eventually learns by experience that it is unwise to judge the merits of a new seedling by its virgin bloom which is frequently far better or much worse than its established bloom, and this fact may have some bearing on the stability or instability of the new clon. This is one of the many subjects I wish I knew more about or had time to investigate, but I hope that others have accumulated sufficient data to speak authoritatively and I hope that they will not refrain from contributing their observations.

Although disease and poor stamina are responsible for the disappearance of some irises the principal reason a new iris variety does not persist is lack of public acceptance. Many breeders discard scores of their iris creations that are better than some that others have the audacity to name and introduce. Although the chrysanthemum and the hemerocallis are now competing with the iris as regards the number of new varieties, it must be remembered that irises have such a head start on other popular perennials as to be virtually unbeatable in this scarcely meritorious field. To the iris of today might well be applied the immortal words of Thomas Gray who wrote:

"Full many a flower is born
to blush unseen,
And waste its sweetness on
the desert air."

The "desert air" in the case of the modern iris being public disregard. I have seen many uncommon irises that have been named and registered and that rank well up in the iris 400 if they were generally disseminated and well known. Then there is the case of the stunning pink *plicata* that staggers under a weird name of significance only to its originator and which is scarcely known

outside his personal circle although it graces his garden in great clumps.

I have made quite a study of the conditions of iris acceptance by the public. A long treatise could be written on this subject alone, but briefly, the principal factors influencing public acceptance and popularity are:

1. A really good or striking iris to start with.
2. A good name, descriptive, euphonious and pleasing.
3. An attractive and interesting catalogue description.
4. An origination of a prominent or well-known breeder.
5. An introduction of a popular and successful dealer.
6. A good dissemination for testing prior to introduction.
7. A consistent price policy during its first five years.

These factors are listed in what seems to me to be their relative order of importance, and it would seem that the individual and collective importance of some of these factors is not realized by even some of our foremost iris breeders. It is my observation that a poor name applied to a good new iris can do more to damn and handicap its success than any other factor. Good names for irises are far from exhausted, yet every year we observe irises christened with "incompetent, irrelevant and immaterial" names that are neither descriptive, euphonious or pleasing. As far as I know, such names as Sitting Bull, Muddy Road, Kerchoo, Introvert, Przemysl, Dirty Wench, Skunk Hollow or Paralysis have not yet been applied to irises but others as unattractive have been used and many an otherwise fine iris has suffered because of its creator's whim or caprice.

It seems to me that if possible a pleasing and different name of the color itself should be the first aim of the

iris christener. Names like Chicory Blue, Ming Yellow, Copper Pink, Ruby Glow, Red Amber, Jasper Agate, Jay Blue, Vatican Purple, Pink Opal, Sable, Golden Majesty, White Spire, Apricot and many others are flawless in this respect.

Then come many splendid descriptive names which indirectly or comparatively allude to the coloring such as Prairie Sunset, Brown Thrasher, Snow Flurry, Shining Waters, Azure Skies, Red Valor, Daybreak, Black Forest, Painted Desert, Blue Shimmer, Indiana Night, Grand Canyon, and many others just as good.

Next in relative value come those names that by allusion, connotation or reference imply a description. Sometimes the reference is far-fetched, or the name harsh or non-euphonious, but some good examples are Mexico, Fiesta, Matterhorn, Lighthouse, War Eagle, Diana, Reveille, Firecracker, Fort Knox and Arctic.

Descriptive adjectives and names having no reference to color sometimes make good names, such as Chivalry, Marvelous, Nobility, Glory, Gaiety, Inspiration, Extravaganza, Valiant, Exclusive, and the like.

Many popular and pleasing names are taken from given names, mostly feminine; from geography, from mythology and canonology, from foreign languages and even from other flowers and from fairyland. Some that occur to me are Anitra, Janice, Christabel, Brunhilde, Beowulf, Rameses, Alastor, Leilani, Snoqualmie, Treasure Island, Sandia, Lancaster, Monadnock, Oregon Trail, Missouri, Alta California, Lothario, Purissima, San Gabriel, Omaha, Los Angeles, Calcutta, Dubrovnik, Evadne, Antares, Andromeda, Gayoso, Asia, Persia. All and many more perfectly acceptable.

When we get down to honoring par-

ticular people and events we frequently run into trouble, for fame is transient and a popular name today may be obsolete tomorrow. Heroic Viipuri was remembered in an iris but now that it is Viborg again the name relates only to a historical incident. Ella Winchester, Ethel Peckham, Grace Sturtevant, Frieda Mohr, Edward Lapham, Mab Chadburn, Elsa Sass, Genevieve Serouge, Frank Adams, Grace Lapham and Maizie Lowe are all very good complimentary names, but when we tack on a professional or marital title such as Dr., Mme., Mrs., Mlle., Prof., we not only violate established nomenclature practice, but we unduly emphasize the attainments or the marital state, rather than the individual whom we wish to honor or compliment.

The above general classes of names include what may be considered choice, excellent, fine, good and nice names. Other classes include the fair, indifferent, poor and freakish names. I long ago stopped buying any irises encumbered by meaningless, dissonant, derisive or absurd names. Time is just too short to try to repeatedly explain what some freak name means or why it was chosen.

Like most irisarians I passed through the collector stage of development, and although it took a lot of my time and money I do not consider them wasted or misspent, for it was distinctly educational. It not only portrayed better than any words the evolution of the modern iris, but it also demonstrated emphatically the difficulties and risks that confront the novice breeder who does not own, or have access to, a garden containing all varieties possibly similar to some new seedling which he thinks is surely good enough for introduction.

Like most iris growers, I started my iris collecting stage by ordering col-

lections. This is a satisfactory, time-honored and economical method of getting acquainted with iris varieties. Some dealers specialize on collections of many kinds, but other dealers offer none at all.

Collections comprising about one hundred different varieties of irises that were rated among the best only a decade ago, can still be bought for twenty dollars or less. Included in these collections will be some distinctly second-rate varieties on their way to oblivion, but these serve the useful purpose of providing a comparison with the better varieties obtained, and of awakening interest in iris development. Likewise, these old varieties are useful in studying first hand the improvement of the species as their newer descendants are gradually acquired. Some ancient varieties like Dominion, Kashmir White, Queen Caterina, Amas, *pscudacorus*, *albicans* and others are of historical or sentimental interest and are worth keeping for their special significance. Some other varieties that have been the founders of long iris families are worth keeping as progenitor types to visually trace development. However, if a variety is mediocre by present standards and has no sentimental historical or genetic interest it is advisable to discard it, unless it is needed to cover vacant ground until other varieties are acquired. Irises may be discarded by consigning them to the compost heap or rubbish pile; by taking them out and planting them along sunny roadsides and by giving them away to friends, neighbors and anyone else who will accept, in which case you owe it to yourself and to the fraternity to include with the gift a durable stake label, well-marked with the name of the variety. Mere discovery of the fact that irises have names has aroused the interest of many a subsequent iris lover.

In planting these initial collections, which I would start with again if I had my iris career to repeat, I have observed that there are three ways of arranging the varieties. It appears that a straight border row with the varieties in alphabetical sequence is one of the most common ways, with random planting and color and type grouping coming in the order named. I have always preferred the grouping of varieties according to their colors and types, because such grouping immensely facilitates an accurate comparison of varieties which to me, as an iris student, is more important than color symphonies and artistic arrangement. For example, I have in the center of my deep yellow bed the sterling varieties Berkeley Gold, Ola Kala and Spun Gold surrounded by a dozen or more of the golden iris peerage. Hardly more than a glance at the bed is necessary to compare relative height, branching, vigor, blooming season and flower quality. My reds, pinks and whites and bicolours are similarly arranged, but my blends are quite dispersed and I don't happen to go very heavily for the blues and purples.

However, if harmonious color arrangements are desired as part of a landscaping program, it is well to observe how varieties complement each other in an initial planting before undertaking permanent decorative plantings. Many competent articles have been written on the subject of artistic iris planting and were I contemplating such a planting I would refer to such authority rather than conduct my own experiments along this line.

After a couple of years of iris education gained by observing the performance of collection varieties and consulting later iris catalogs and the invaluable Iris Check List, it will be about time to divide many of the first-planted

clumps and to come to a few decisions regarding one's iris future. These decisions relate to how much space one can give to irises; what branch of irisology is most interesting; whether to be an omnivorous collector or to specialize in certain species, colors or types, and whether to join and participate in the American Iris Society. Another important decision to make concerns the time and money you can budget to your iris garden and whether it is to be a full-fledged hobby, or just an avocational side-line. These decisions somehow make themselves in time, so there is no use staying awake nights worrying about them.

However, if the iris bug has really bitten you, and regardless of your decisions you are going to buy more irises, then is the time to taper off on your buying of collections and begin to make your own varietal selections according to the whim, caprice or plan you have decided to follow. Right here comes a point that took me some time to learn. Your money will go farther and you will get quicker and better results by purchasing fewer varieties and more of them, buying three or more plants of a variety rather than single rhizomes. Not only do increasingly favorable prices apply to units of three, five, or a dozen of a variety, but by planting these units quite closely together to form a quick clump, a more effective use of a limited area is secured. Groups of three or five rhizomes may be planted radially toe to toe. This will prevent congestion in the center of the resulting clumps and will assure a pretty good display from the particular variety the first year after planting. Or triangular, pentagonal or other geometrical arrangements may be used to avoid the aimless, ragged appearance that random planting so often develops. In planting clumps of tall bearded iris

in a border, the triangular clump with the points facing forward, provides an excellent space for the interplanting of the unappreciated but lovely intermediate and dwarf irises, or for some low-growing, orderly mid-summer perennials like Geums, Heuchera and the like. Here again though, it is my preference to arrange clumps of varieties of the same color in the same round or oval rectangular beds to facilitate varietal comparisons.

The arrangement of irises in beds and groups is by no means confined to grouping by color classes for comparison, or to grouping for pleasing color effect. I have seen several novel groupings in various gardens of the country that are worth emulating. The fact that even many of our most modern irises are only a few generations from the species makes it possible to have fairly small beds portray the entire evolution of the key variety. If such an interesting exhibit is undertaken, be sure to check the family tree of the key variety for the present availability of its ancestors. This requires that they be named varieties still in commerce. For example, the ancestors of Wabash are still available for at least four generations, so a large clump of Wabash in the center, surrounded by semi-annular groups of Dorothy Dietz and Cantabile, which, in turn are surrounded by quadrants of Wyoming and Lent A. Williamson alternating because both Dorothy Dietz and Cantabile derive from these latter two. Surrounding the entire bed might be a border of Amas and although the other parent is unknown, it can be re-created with considerable accuracy if really desired.

One charming iris bed that I saw last spring included only those varieties bearing feminine given names, arranged tastefully in color groups. The number of varieties bearing feminine names

ranging from Aphrodite to Yolande is surprisingly large and offers many opportunities.

Then there are the iris beds which are composed of state and city varieties. California, of course, heads the list in having irises named after its cities. A bed bordered by Alta California and containing clumps of Los Angeles, San Francisco, Santa Barbara, Santa Clara, Santa Rosa, San Diego, San Luis Rey, Sacramento, to mention only a few, would provide the novelty many iris gardens need to lift them out of the commonplace. Missouri and St. Louis might be the basis of another combination, as might also Nebraska and Omaha. Colorado and Odoroc still await their Denver, Arizona its Phoenix, Helena its Montana; although Portland has its Oregon Beauty, its Oregon Giant and its Oregon Sunshine, Wyoming awaits its Cheyenne.

Mythology ranging from Alastor and Antares to Zeus and incorporating astronomy provides another basis for grouping as does geography with its Asia, Great Lakes, Pacific, etc., while lovers of art, music, drama and the occult can find an expression of their interests in iris variety names. One of the most interesting and educational iris plantings of which I know consists of clumps of all the Dykes Medal winners and runners-up arranged by years of award. It certainly illustrates iris progress.

Finally, it would be an interesting stud, requiring a few years' observation of blooming dates, to compose an iris group in which each succeeding variety bloomed one day later. The possibilities are limited only by the imagination.

Buying all your irises from only one dealer is sometimes recommended, but has the disadvantage of preventing you from comparing his business practices

with those of other dealers. The principal commercial growers of this country, about thirty in number, are, on the whole, an honorable and dependable group of small businesses run by friendly men and women, fully deserving of your confidence and support. It is true that their ideas of liberality, merchandising methods, customer appeal and quality of stock differ considerably. For every shortcoming there is usually some good practice to compensate. My experience leads me to the conclusion that I should buy most of my irises from at least three dealers located in the three principal iris regions of the country, i.e., the Pacific Coast, the Midcontinent and the Atlantic States. As soon as possible I would visit the gardens of the dealers nearest to me and form a first-hand opinion of their operations. As far as practicable I buy newer varieties from their introducers, because their stock is likely to be large and better. If you appreciate the kind of service you get from a dealer, compliment him on it, and if you have cause to be dissatisfied give him the chance to make amends. For the most part our iris dealers are just "poor boys and girls" trying to get along by catering to your hobby and they depend on you as you depend on them.

Throughout the foregoing paragraphs there have been several passing references to breeding. Since this is the subject of greatest interest to about fifty per cent of all irisarians, I have reserved until the last my confessions on that subject. Sooner or later, the yen to do a little tentative iris breeding seems to afflict us, and I was no exception. After early observing the big, fat pods full of plump seeds resulting from occasional natural pollinations, it was only natural to learn how to hand-pollinate iris flowers.

Then it was only a step to observe that some varieties carried no pollen, while others seemed completely sterile. This, of course, led to a study of chromosomal variations in species and hybrids. While all this was going on, my earliest seedlings, hundreds of them, began blooming and displaying their amazing mediocrity to my dotting eyes. I blush to admit that I kept probably a third of them for a second year's blooming, while I made up my mind what to do with them. Fortunately, I had the benefit of some sage advice from a senior breeder, so the next year all but two of about three hundred seedlings went into the rubbish pile.

Why did I scrap them instead of giving them to friends and neighbors? My reasoning was something like this. Fully half of the seedlings bore a fairly close resemblance to some of the varieties, but most of the rest were obviously trash. I figured that if I gave them away it would only be a question of time until they would come back to plague me in the hands of people who would want to know their names. If I recognized it for something it wasn't and miscalled it a whole tribe of a spurious variety would come into being and begin to compete with the real variety. If I declined to recognize and name it, I would be just a meany who was holding out. Hence the rubbish pile for about 99% of my seedlings, a percentage which has since increased, despite the fact that I have since learned that an iris itself unworthy of a name may carry blood lines most helpful to its progeny.

How about the seedlings I didn't discard? Well, there's where the expense began to come in. I realized, of course, that unless some otherwise very promising seedling was not different from and better than all the other similar varieties, it should be neither named

nor introduced. I was rather partial toward pink blends at that time and the woods were full of pink blends that I had to expensively acquire to compare them with mine and mine always suffered by comparison. Although it was cheaper for me to buy a lot of nice new introductions than to travel around looking at them in other's gardens, there are such concentrations of new varieties in some sections of the country that it may be cheaper to travel than to buy, but you'll probably want the variety for breeding stock anyway, so you might as well buy it in the first place.

So, as far as iris breeding for the evolution of new varieties is concerned, in spite of all its pitfalls and disillusionments, I'd do it again, with this important qualification. At least half of my efforts would be and are devoted to the development of specialized varieties for breeding stock rather than for possible introduction. By specialized varieties I mean fixed or true varieties rather than mere clons; disease resistant varieties; extra prolific varieties; mid-summer bloomers, etc. These are some of the breeding projects that every amateur breeder will find fascinating as he gets into them.

For specialized breeding of this type it is well not to discard your best selections until the performance of their progeny has been observed, for irrespective of its rating and its awards an iris is not really great until it is proven capable of transmitting its qualities, as dominant characteristics, to its descendants. This is just as true of irises as it is of dairy cows and laying hens that attain only a transient fame from their sensational yields of milk and eggs until their sons have proved capable of transmitting those qualities, and their daughters and grand-daughters have demonstrated their inheritance.

Just one other thought for amateur iris breeders. Even though a given cross between varieties yields nothing passable, the effort will not be wasted if you make it an simultaneous inheritance study and report your results. To make an inheritance study make sufficient pollinations to yield enough pods, perhaps twenty, to give at least 256 blooming seedlings after raising both the first and second year's germinations. When these seedlings bloom, classify them into 16 different types if possible; count and record the number of each type; and report your results. Your results when confirmed, will fairly well determine the transmitted characteristics of the immediate members of the particular union.

Because of the general use of the word "irises" throughout this account, it must not be assumed that pogon or bearded irises alone are meant. Far from it, because in my opinion no iris garden is complete without a plentiful representation of several beardless species. *Iris pseudacorus*, the fleur-de-lis, in its five or six varieties, deserves a place in the moistest part of any garden that is in the sun, if for no other reason than to serve as a criterion of vigorous growth. Some of the greatly improved Siberians and some of our water-loving native species and hybrids, as well as some of the better spurias can surround the clumps of *pseudacorus* to advantage, while if your soil and location are adapted to Japanese irises, some of those will add a touch to the garden that nothing else will give. Where some of the beautiful little gems such as *I. verna* and *vernumont*, *I. tectorum*, *I. cristata*, *I. reticulata* and *I. stylosa* will grow satisfactorily, they should not be overlooked. *Iris dichotoma* is interesting in a group but would never perform well for me, nor would any of the Juno group. Many of the Asi-

atic species such as *I. watti*, *I. japonica*, *I. gatesi*, *I. lorteti* and others do well in the dry summers of the Pacific southwest. I have found them very adaptable to cultivation as house plants, particularly *I. watti*, *I. japonica* and their hybrids. I have long grown Dutch, Spanish and English irises also, but that is another story, as is that of Dietes where they can be grown.

Nor am I solely an iris addict. I learned long ago that as yet the irises simply will not fill the floral season. After a lot of trial and error I have finally rather settled down to a garden where irises, peonies, daylilies, phlox, chrysanthemums are the predominant

perennials, with a scattering of hollyhocks, mallows, heleniums and lilies. Cannas, dahlias and gladioli, narcissi and tulips round out the show.

Why my interest in irises and these other flowers? Well because I think a man or woman requires the psychological balance that a hobby gives, and gardening as a hobby gives that outdoor exercise and brings that pleasant feeling of accomplishment that are so necessary for rounded and gracious living. Finally, I have found that no matter what the cares of the day or the problems of the morrow, one simply cannot keep them in mind to worry about while out in the garden.

FOUR GARDEN SCENES

FROM THE WORK OF

MR. FLETCHER STEELE

BOSTON, MASS.

To cross a barrier is more fun than to have no barrier at all. This wall was built up to invite the wanderer through and beyond, not to keep him out. On the far side are great trees, planted a hundred years ago. They dominate the garden and the wall, which is there only to enframe them and emphasize their importance. The gateway is there to guide the eye to the heart of shadow which lies under the old trees. It was designed to create a mood, which only a tree will satisfy. (See page 36.)

This wall was designed to keep people out. For within, as like as not a woman is taking a nap with no powder on her nose.

The wall is formidable, yet it is not supposed to indicate that the area beyond is dreary. Quite the contrary, to judge by the trees, bright sun, dark shadow and the busy tinkle of fountains. Outside, however, impersonal walls push the visitor along to the bell at the house door.

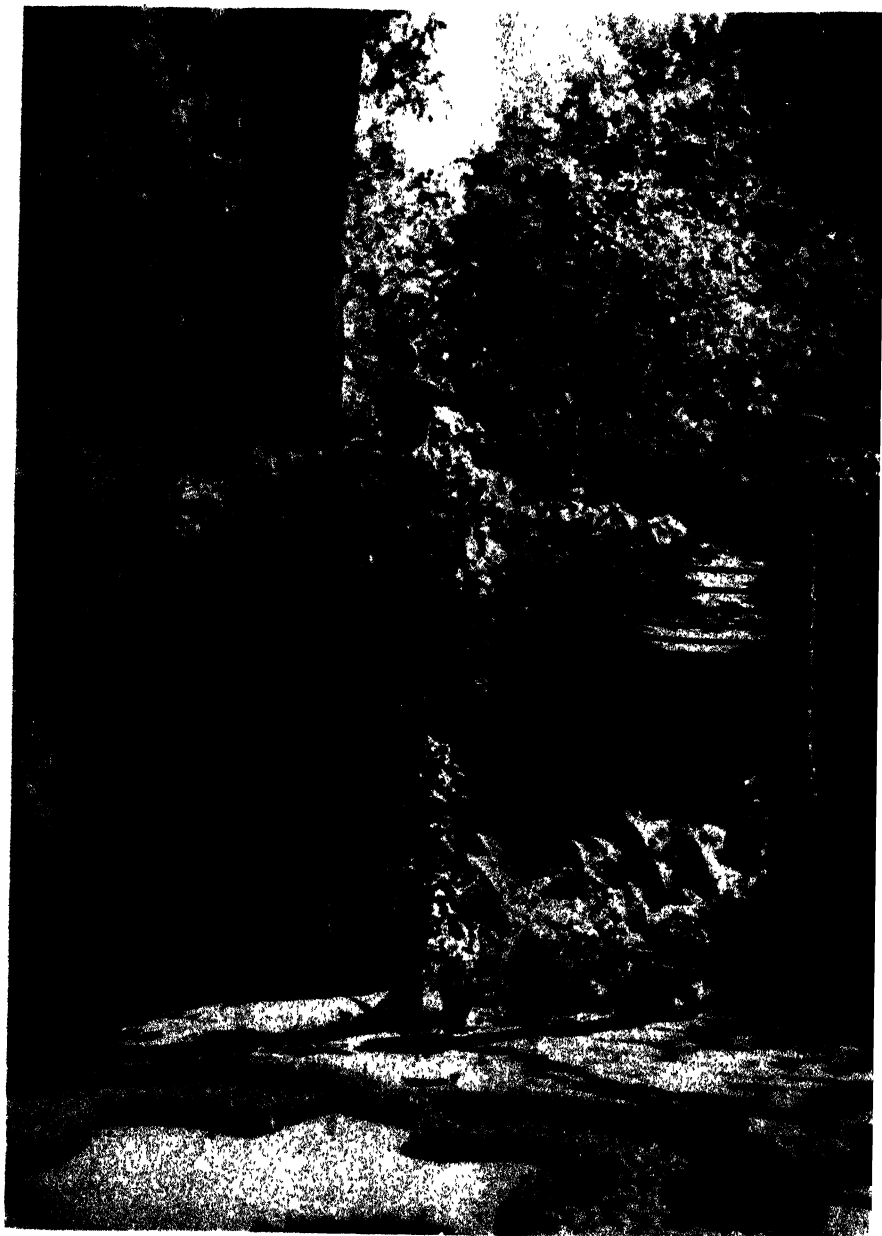
The place is unmistakably American. Yet the idea might have come from France where there are no visible front yards. Instead high walls border the sidewalk. They hide gardens where babies play, women shell peas and old men read their papers not a yard from the public way, shielded from confusion and curiosity. (See page 37.)



"This wall was built to invite"



'This wall was designed to keep people out.'



"An old elm tree"



Paul J. Weber

"Here a dull barren hillside"

An old elm tree, sprangling wild grapes and beds of ferns keep primroses away from this small sophisticated, formal garden. Around the fountain is a pattern of box edging and beds paved with pink crushed marble, black coal and brown flagstones. Tall posts support the grape awnings. They are gilded and painted. Yet the use of native plants which are encouraged to go their own way within reasonable bounds, gives the impression that nature is content. (See page 38.)

Architecture loses stiffness when accommodated to topography and subordinated to planting. Even long flights of steps look "natural" when they seem to offer help to the wanderer rather than a challenge.

Here, a dull barren hillside was moulded to agreeable form by scraping off soil and subsoil from two to five feet deep. This revealed hidden boulders and strong rock formation into which the steps were fitted.

The bank was then recovered with wood soil and planted with material which thrives in the neighborhood. Thickets of American beech, Mountain Laurel, blueberries, ferns and ground cover were put around the half dozen existing trees.

Much care was used to associate kinds of plants and to vary the heights and distances apart to agree with observations and measurements made on wild land. Little as one might suppose, it required great pains to make a convincing natural effect with plants. (See page 39.)

The Illusive Ivy—IX

(Part II)

ALFRED BATES

CORRECTION. Please change date, in legend, p. 217 last issue, to read 1863.

1864. In August of that year Dr. Berthold Seemann began to publish his Revision of the Natural Order Hederaceæ in Vol. II of the Journal of Botany, British and Foreign. In the October issue (p. 303) he reaches the genus *Hedera*. As these papers were later published in book form—Revision of the Natural Order Hederaceæ; 1868, and the book is more easily obtained, all future citations will be made from it. Our reference starts on page 30. Seemann here announced his discovery that the formation of the hairs on the young growth and on the inflorescence of all the true ivies could be used to separate the various species. It is a microscopic distinction which has been used ever since. However he made an excusable error in that he combined all the Asiatic forms (*colchica*, Wallich's ivy and *rhombea*) under one species denomination *H. colchica*. This error was excusable because the hair formation of all three are scale-like and very similar in appearance and, presumably, he had no live material of the Wallich ivy to work with (if he had he would surely have later recognized Hibberd's "cinerea" and only too gladly taken Hibberd to task). But what is surprising is that although he was in communication with Koch in regard to *H. colchica* no mention is made of the name "nepalensis" although under *colchica* he cites references to both Don and Wallich and gives De Candolle's "chrysocarpa" as a questionable synonym. (Rev. Nat. Ord. Hed., p. 33.) If this omission had been an oversight in the Journal it could have been corrected in the book, had Koch desired, for Seemann clearly states that he had been in communication with Koch re-

garding *H. colchica*, "It is owing to an authentic specimen kindly transmitted by him that I am able to identify this new species with the Asiatic Ivy." (ib. p. 32) It seems evident that Koch did not call Seemann's attention to this name of "nepalensis" and we can only surmise that either he (Koch) had forgotten it or had come to the conclusion that he had rashly given it with too little knowledge of the plant (remember he cited book references only) and was willing to drop the name. As stated above, Koch never referred to his name "nepalensis" after publishing it in 1853 even though he treated the entire genus in *Wochenschrift für Gaertnerei und Pflanzung* (1859) and again in *Dendrologie* (1869).

We may then be reasonably sure that live material was *not* known to either Koch or Seemann; and probably not even herbarium specimens, for neither refer to them, giving only citations from books which were not illustrated. (I have not been able to ascertain the dates when Wallich's specimens were deposited in the Kew and the British Museum Herbaria so cannot prove this point.) Had either writer seen illustrations, dried specimens or living plants of the Himalayan Ivy they would have at once noticed the differences between the thin textured, deeply lobed, long leaf of this plant and the thick textured, unlobed, wide leaf of the Colchian Ivy.

Against this claim two objections might be raised; first, we have a name which could be our plant, and secondly, how else could Seemann have known of the scale-like formation of the hairs? As to the first objection; some form

of the plant was undoubtedly grown in England at this time for Hibberd's list of 1863 contains the name "himalaica" (even though the description is both faulty and vague) and he does not refer to it as a novelty although as stated above I can find no earlier listing of that name. We may therefore surmise that it existed in *some* nurseries; that neither name nor plant was well known the following extract will prove. In Vol. 33 of the *Journal of Horticulture and Cottage Gardener*, issue of Jan. 31, 1865, p. 86, G. Abbey in an article on Ivies gives a short list of named forms in which he makes this observation, "yellow berried sub-variety (*H. helix baccifera lutea*, which is synonymous with *chrysocarpa*, there being a *H. helix chrysocarpa* from Northern India, with narrow-lobed leaves, having silvery veins)." Furthermore we may conclude that as such plants as bore the name had not yet fruited Seemann may have easily overlooked it.

In answer to the second objection we may point out the very clear statement of Wallich's that the peduncles are "all covered with minute stellate silvery scales. Flowers . . . covered on the outside with scales." Seemann seeing the scale formation of both *H. H. colchica* and *rhombea* (at this time it was positively grown in England, at least in its variegated form and under its true name) was similar, may have considered Wallich's statement authoritative enough to accept. We must also remember that the leaf of *rhombea* approaches that of *colchica* in that it is not definitely lobed, is not particularly thin in texture and is proportionately wide in relation to its length. Therefore Seemann, without live material of all three plants before him, can not be severely blamed for considering the three Asiatic ivies as one species.

1866. In 1865 *The Gardener's*

Monthly, edited by Thomas Meehan of Philadelphia, reprinted in full Seeman's descriptions of the European, African and Asiatic Ivies from the *Journal of Botany*. This evidently stimulated some interest here in America for in the following year (1866) a list of 43 named forms was published. The article is unsigned and so was probably written by Meehan himself. It contains a very brief description of each but in the text which follows the list some additional information is added. Our plant is listed under the name "*chrysocarpa*" and two references to it are added in the text. "19. *Helix chrysocarpa* (North Indian variety) golden berried English Ivy," and in text, "No. 19 has elegant narrow-lobed leaves with silvery-white veins. . . . For miniature growth or comparatively low walls, and close leaf-growth, Nos. 21, 33, 19, 41, 34, 26, 23, 31, may be chosen." (*Gar. Monthly*, 1866; p. 28.) It would be interesting to know whether this description was made from first hand observation of plants imported from England or merely compiled from an English list. For it should be noted that the plant in question has "close leaf-growth" as against Hibberd's "slender, long-jointed" habit of "himalaica" in his list of 1864. However, because of the name, it may be Hibberd's "*chrysocarpa*" and if so is not our plant. Meehan may have been using Hibberd for authority for in 1874 an article by Hibberd appeared in *The Gardener's Monthly*.

Other than the occurrence of our plant in the 1874 article which will be cited later, no further mention of any of the names can be found in later issues of *The Gardener's Monthly* or any other American publication which I have seen. And it was tantalizing to find, in the library of the New York Botanical Garden, a copy of a catalog issued by George Such of South Am-

boy, N. J. dated 1881 in which he states he was discontinuing listing the large number of named ivies which had been cataloged for many years although he still carried the plants. Further search has failed to bring to light any earlier catalog and should any reader know of the existence of one dated during the late 1870s will he kindly let me know of it.

1867. In *The Gardeners' Chronicle* (issue of Nov. 30, 1867; p. 1215) William Paul, a prominent English horticulturist and nurseryman, gave a list of 40 ivies which was his selection of the best forms in cultivation and to each name he gave a short but quite intelligent description. This list was translated into German and published by the botanist Koch in *Hamberger Garten- und Blumenzeitung*, 1868; p. 17. Koch made some suggestions as to a rearrangement of the order in which Paul had listed the forms. Paul compiled with Koch's suggestions and republished the rearranged list in *The Florist and Pomologist*, 1870; p. 269; which was immediately published by Koch in *Gartnerei und Pflanzenkunde*, 1870; p. 403. The names and descriptions are the same in all four lists and "himalaica" does not occur but "chrysocarpa" does.

As we are trying to make a critical research as to names, what they stand for, and how and when they came into use we must therefore question and analyze Paul's listing. Undoubtedly the ivies named were those which Paul carried in his own nursery; but it is so large that we cannot but wonder why it did not include "himalaica." Was that plant unknown to him? Did he consider it of so little importance or so small difference that he did not think it worth carrying? Was it one rejected from his selected list? Was it professional jealousy that prevented him from listing and carrying an ivy

some other nursery had got before he had? Or was it his "chrysocarpa"? (Note Koch's remark later on.) These are questions we cannot answer knowingly. But this we do know; he was willing to work with botanists who knew more of ivy classification than he did for he both cited Seemann's division of the genus and followed Koch's suggested rearrangement of his list. That he had been in communication with Koch is proven by the fact that both rearrangements—his and Koch's translation—appeared simultaneously, in the December issues of the English and the German publications. The fact that neither he nor Koch mention the name "himalaica" inclines us to conclude that it was not in general use; and this seems reasonable from the remarks made by Koch in his notes on the list of 1870. At the end of his article he (Koch) says, "In spite of the great number of forms presented here we regret the absence of several, which in Germany, at least, are widely distributed, two which grow in Ireland—*H. hibernica* and *Hodgensii* . . . (G und P. 1870; p. 404) and to "chrysocarpa" which is described by Paul as, "Leaves dark green, small; growth rapid. Berries yellow." and translated by Koch as, "Leaves small, very dark; berries yellow." Koch adds a footnote, "The true *H. chrysocarpa* Requ. has roundish buds with golden yellow scales and differs in otherways from the form named here." (G. und P. 1870; p. 403.) We can only conclude that there were two "chrysocarpos" in nursery lists and that the orange fruit of one had not yet been seen. But the surprising part of it is that Koch when he had so good an opportunity to refer to his name "*nepalensis*" did not do so.

1870. The next mention of our plant occurs in *The Garden Oracle* of 1870, an annual publication edited by Hibberd and much like present day Gar-

deners' Almanacs. In it Hibberd made his preliminary announcement to the general public of his creation of a new nomenclature. The private announcement had been made earlier for the article was "abridged from a Paper communicated to the Linnæan Society." (G. O., 1870; p. 123) and contained his new names with very short descriptions. "*Cinerea*, known in gardens as 'Himalaica'; it has the most decidedly grey-tinted leaves of any in this section." (G. O., 1870; p. 124.) However we have full descriptions, for the paper in its entirety was published later in that year in another of his magazines, *The Gardener's Weekly Magazine*. But before either of these were given to the public there are several items which are of interest to us even though they do not have direct bearing upon our plant.

In *The Gardeners' Chronicle* of Dec. 4, 1869 we learn that at the meeting of the Linnæan Society held Nov. 18, 1869 a paper was read, "*On the Classification and Nomenclature of the Species and Varieties of Hedera*, by Mr. Shirley Hibberd; communicated by Mr. W. Robinson." (Gar. Chron., 1869; p. 1259.) This called forth a letter from Seemann, for Hibberd had tried to take credit for the discovery of the ray-formations. This letter reads in part, "At p. 1259 you give a brief abstract of a paper on garden Ivies, submitted by Mr. S. Hibberd to the Linnæan Society, and of which I have seen the full report. Mr. Hibberd does me the honour of adopting, though without acknowledgment, my interpretation of the genus *Hedera*, and the species composing it, as published in my 'Revision of Hederaceæ' . . . A careful study of our garden Ivies might thus prove of direct scientific value, and I was in hope that Mr. Hibberd's paper would have been the result of such a study. But I cannot help thinking that

he has been ill-advised to submit his researches in their present raw state to the consideration of the Linnæan Society. He is altogether wrong, as every botanist will tell him, to change well established specific names—absolutely inassailable as far as their right of priority is concerned,—because they do not harmonize with the system of nomenclature set up for his varieties." (Gar. Chron. 1869; p. 1281.) In the next issue of this magazine (ib.; p. 1308) Hibbard had the effrontery to defend himself by claiming that he had not seen Seemann's writings on the subject. As a research worker on ivies he should have made it a point to familiarize himself with his subject. Seemann was an outstanding botanist and his work on the genus had been published in 1864 and reissued in book form in 1868 and *must* have been known to Hibberd if only through his capacity as editor of several horticultural magazines aside from his interest in the subject. And furthermore his own publication, *The Gardener's Weekly Magazine* (Vol. VI, Oct. 22, 1864; p. 342) had contained the extract from Seemann's *Journal of Botany* regarding the hair formations of the Ivies of Europe, Africa and Asia.

Here at the beginning of our consideration of species and varieties, the fact that Hibberd did not do any research work and that his conclusions, and descriptions, were wilfully distorted to fit into his system of innovations cannot be too strongly stressed for it will come up constantly in regard to every species and variety save *H. Helix* and a very few of its forms. A research worker in any subject must acquaint himself with what has been done before him and with what is being done in the period when he is working. There will always be many odds and ends—and often important ones—tucked away in obscure corners of even the literature

which he examines and has access to that will inadvertently be overlooked, without deliberately ignoring information which is where everyone may read. After over a dozen years with Hibberd's book and the magazine articles of that period before me, I must confess that I am decidedly prejudiced against his work and the manner in which he did it and especially with his arrogant brushing aside of bona-fide names and cannot understand why some botanists accept his confusions. His work was thoroughly unscientific, his descriptions were uneven and hastily made in that he often overlooked the most salient features and his belief in his own infallibility amounted to cocksureness to a ridiculous degree—see later his letter to André regarding our plant.

Before his paper was published in full, the first issue of *The Gardener's Weekly Magazine* for 1870 contained a notice on p. 15 to the effect that Hibberd had sold his collection of Ivies to Mr. Charles Turner, a nurseryman of Slough. It would be of great interest to us if we could see a catalog of that nursery dating from that period. Whatever financial profit this transaction brought Turner it was evidently not because of the new names for when the R.H.S. made a collection of ivies for their garden at Chiswick in the late '80's Mr. Turner contributed many of the plants under their old names including *himalaica*; but of this more will be said later.

The publication of Hibberd's paper in *The Gardener's Weekly Magazine* began in the issue of March 19, 1870 and ran through seven installments including the same leaf drawings used in his book. At the end of the first installment he refers to his series of '63 and asks his readers to ignore that classification and the names to be found in books "as I shall offer presently some-

thing better, having I trust, settled all the technical details of the subject in a way that will last for some years to come—for our time at least, whatever the next generation may require." (*Gar. Week.*, Vol. 13, 1870; p. 128.) Brave words from a man who had just been rebuked by a botanist of Seemann's standing! Did he think that botanical nomenclature should change with the fashion in dress? Or that horticulturists had the right to wipe out botanical names whenever it suited their whims?

The list of forms begins in the third installment where we find our plant: "13. CINEREA, *the Grey-leaved ivy*. (syn. *Himalaica*).—Very distinct and interesting; scarcely robust, but growing freely. The leaves are smallish and peculiar in form and colour; in some instances they are three-lobed and nearly triangular, in others the central lobe is prolonged, and has a few sharp



CINEREA (No. 13).

From The Gardener's Weekly 1870, p. 152; and as in The Ivy, 1872, p. 76.

subsidiary lobes and notches on the side; the colour is greyish green, the lines of the principal veins being a lighter grey than the blade, and inclining to a milky hue. This is the most tender variety in the section, a severe winter damaging its appearance considerably." (Gar. Week., Apr. 2, 1870; p. 152 & The Ivy, 1872; p. 71.) A drawing of a leaf is shown and is here reproduced. This is certainly our plant, or some form of it, even though no mention is made of either the very characteristic pinkish purple flush on the new growth or the violet cast of the under surface of the leaves in winter; nor of the lax petiole. That no mention is made of its berried form proves that it had not developed its mature stage in England at this time. That Hibberd did not list "*chrysocarpa*" as a synonym proves, at least to me, that he had not made any search into nomenclature and that he had *not* collected plants from all available sources for "*chrysocarpa*" was known in England as the "Northern Indian" ivy, at least in some quarters, as we have seen from the notation by G. Abbey cited above.

1874. In Thomas Meehan's The Gardener's Monthly, issue of Jan., 1874, Hibberd contributed an article on ivies in which he described our plant from a new angle. "*Cinerea* ('Himalaica' of the books)—The young leaves are deeply, sharply and peculiarly lobed, but as they acquire maturity, the lobes disappear, and in winter there is not a sign of a lobe to be seen." (G.M., 1874; p. 5.) It should be noted that here for the first time he refers to the deep lobing and claims that the leaves lose their lobing in winter (a figment of his imagination) and that he ignores the grey band along the veins and omits the color and the size of the leaves.

1882. Although there are many

articles and small items on ivies, almost always under the old nomenclature, during the 1870's our plant is not mentioned again until in Vol. 22 of The Garden (Nov. 11, 1882; p. 430) a brief note calls attention to an article by E. André in Revue Horticole of Aug. 16, 1882, entitled "An Ivy with Red Fruits." Upon referring to the French journal we find that André had compared his plant with Hibberd's "*cinerea*" and, having decided it was different, had suggested another name, *H. H. erythrocarpa* (red-fruited). (R. H., 1882; p. 356.) But he had depended upon another's description of the color; he having seen the plant only while the berries were still green. He promises a fuller description together with a colored illustration in Revue Horticole when he would obtain ripe fruiting sprays from the Riviera where his attention had first been called to the plant.

1884. Over a year later The Garden (Vol. 25, March 1, 1884; p. 178) again calls its readers' attention to André's ivy, this time under the name *H. H. var. aurantiaca*, as recently described and illustrated in color in Revue Horticole, "handsome orange-red fruits and long slightly lobed leaves with the nerves on the upper surface of the foliage rendered conspicuous by rather broad shaded whitish zones which run parallel to them." And in the next issue (ib. p. 199) informs its readers that plants of this ivy will shortly be sent out by Messrs. Besson of Nice. Many plants must have been received either directly or indirectly from this source for beginning in 1888 and for the next six or more years we find many inquiries and complaints in the English gardening magazines as to "*H. H. var. aurantiaca*" not producing its orange colored berries but no record of its having fruited.

The article in Revue Horticole is not



Fig. 20. — Ramen de la forme rampante de l'ivry à fruits oranges (*Hedera Helix surculifera*), au 1/6 de grandeur naturelle.

From *Revue Horticole*
1884, p. 84

only accompanied by the colored plate which André had promised but also with a line drawing of the juvenile foliage and a twig showing a state of transition. We have here the first illustration of our plant, other than merely a leaf, and are able to fully identify it. Both of these illustrations are reproduced here though the full beauty of the colored plate cannot be shown in the reproduction. In his article André gives the history of his plant. It had for some years been growing in the courtyard of a villa in Cannes from which it had been propagated by the nursery firm of MM. Besson of Nice. From whence the original plant at Cannes had come no one seemed to know. The nurserymen were responsible for André's first statement as to the color of the fruits and this he now corrects, "not as deep red as the first enthusiastic observer had said but of a beautiful orange." (R.H., 1884; p. 84.) He then tells us that he had written to Hibberd before publishing his full description and gives the

letter which Hibberd wrote in reply.

"Your letter interested me immensely. An Ivy with red fruits is possible, for the genus has certainly given us forms with black berries and perhaps white. Regarding the facts mentioned ivy plants are variable in regard to the foliage and you could have the same variety as that which I have named *chrysocarpa*. My real opinion is that your plant is the true 'Ivy of the Poets' but that it differs from mine by distinct characteristics. You will see on page 76 of my book that the ivy of the Himalayas resembles a climbing form like yours. If it is the same as *cinerea*, you will find as the plant advances in age the leaves little by little lose their lobes and the very distinctly characteristic grey lines which follow the principal nerves.

"As we cannot at this time do else but wait (the fruit and colouring) I am inclined to believe that your plant will not be a *Greek* form but the *Indian* of *Hedera Helix*. If the berries are as one has said of the colour of those of the *Sorbus* of the Fowlers (Mountain Ash) [*Sorbus Aucuparia*, A.B.] you will be correct to describe the plant as the 'Ivy with Red Berries.'

"I have asked Mr. Turner to send to you by post a branch already berried of our ivy with yellow fruits.

Most cordially yours,

Shirley Hibberd."

Even allowing for the double translation—from English into French, then back into English—one would hardly call this a very informative letter from the man who claimed to have settled the ivy question in "all technical details . . . in a way that will last for some years to come—for our time at least." In analyzing this letter one should note that he says there are "perhaps" white berried forms; yet he lists on page 92 of his book "*leucocarpa*, White-berried ivy" although he acknowledges he had

not seen it in fruit. Then he tells André that he "could have the same variety as that which I have named *chrysocarpa*. My real opinion is that your plant is the true 'Ivy of the Poets' but that it differs from mine by distinct characteristics." But he then refers André to his book, "You will see on page 76 of my book that the ivy of the Himalayas resembles a climbing form like yours" and ends with the statement "I am inclined to believe that your plant will not be a *Greek* form but the *Indian* of *Hedera Helix*." If he considered it "*chrysocarpa*," the Ivy of the Poets, how then could he also believe it to be "*cinerea*?" It should also be noted that both here and in the index of his book he claims to have given the name *chrysocarpa* to the yellow-berried ivy of the poets; this is not true for Walsh in 1826 had given it to the yellow-fruited form and it was so known in England at the time when he was writing. Lastly, on page 92 of his book, under "*Chrysocarpa*, Yellow-berried ivy" which he lists as an arborescent form—not a scandent—he describes the fruit as being "a dull deep orange color." Was this color blindness or just slovenly writing? Yet it is a sample of his careless descriptions and faulty research.

The promised branch from Turner reached André who at once saw that it was not like his ivy. "It is necessary then to conclude either that it is a new form or it is an adult form of *H. H. cinerea* the name of which in this case should be changed to *H. H. aurantiaca*. . . ." (R.H., 1884; p. 85.) It is not clear to me whether André meant to change the name *cinerea* or to retain that name for the scandent form and use his name *aurantiaca* for the mature form. He then gives the fullest description based on European material that so far had been made of our plant. "The branches climb like those of the

type before having reached the adult stage, carrying variously formed leaves with long petioles, of which the most are characterized by a triangular and a trilobed form, varying to shallowly divided lobes, the terminal lobe generally a great deal longer than the others. The upper surface, green and shaded with whitish splashes or zones along the principal veins. We must add that in the south these discolored areas often take on a deep violet red color at the end of the season and hold it all winter. The under side of the leaves also often becomes violet.

"The mature branches, or those bearing fruit, are erect and arranged as the ivy of our woods; their leaves gradually (that is, as they approach the end of the branch, A.B.) lose their lobes and indentations and become sharply lanceolate and rounded at the base, till at last (that is, those just below the flowers, A.B.) they are very sharp pointed at each end. The corymbs have flowers with long pedicels and resemble those of the type; they are followed by almost spherical berries of a beautiful orange color, of four bulging divisions crowned by the imprint of a round scar filled in by the persistent stigma." (R.H., 1884; p. 85.) He then observes that "One very curious peculiarity is that the ivy with orange fruit reproduces itself from seed, at least in as much as concerns the form and color of the leaves." Which of course is quite to be expected unless the flowers have been cross fertilized. But what is astonishing is that seed sown in 1883 had by 1884 produced plants which showed their true leaf shape; for according to Tobler the true leaf characteristics of any ivy do not develop until later. My own experience with seedlings of this species will be given later.

1886. The next mention of our plant occurs in Nicholson's Diction-



Hedera helix acuminata

From *Revue Horticole*, 1884.

Plate facing page 84.

Reduced about one third.

ary of Gardening, under the name "aurantia" which is evidently a misprint for he cites the illustration of "aurantiaca" in *Revue Horticole*; but the omission of the last syllable is not corrected in the *errata* to that volume so he may have intended to change the name. It is reasonable to suppose that he was familiar with the plant for he marks it with an asterisk indicating it to be especially good or distinct. His description is meager, "**H. H. aurantia** (orange). * *l.* like those of *H. H. chrysocarpa*, but fruits of a beautiful reddish-orange colour. (R.H. 1884, 84.)." (G.D., Vol. II, 1886; p. 120.) Nicholson restricts De Candolle's name of "chrysocarpa" to the Himalayan ivy and ignores its application to the Greek form for his "chrysocarpa" is clearly our plant even though called "golden-fruited." "**H. H. chrysocarpa** (golden-fruited). * *l.* smallish, sometimes nearly triangular and three lobed; central lobe frequently prolonged, with a few sharp lobes or notches; colour greyish-green; principal veins lined with markings of a lighter shade. A quick-growing climber." (ib. p. 121) He does not list *cinerea* (Hib.) or *himalaica* (H) nor does he give *poetarum* or *poetica* and while listing *lucida* he makes no reference to it being "the ivy of the poets" as Hibberd had maintained nor give any synonyms for it.

1887. In Vol. 31 of *The Garden*, E.C., writing of the collection of ivies in the Royal Horticultural Society's garden at Chiswick mentions our plant; "*Himalaica* makes a free, picturesque growth and clings close to the wall; the leaves are small, ovate, green, with dull white nerves; a useful kind." (*Gar.* Vol. 31, July 2, 1887; p. 613.) In the same magazine, Vol. 34, Dec. 22, 1888; p. 587 we learn that *aurantiaca* which had been imported from France by J. Veitch & Sons in 1884 had not as yet fruited. From then until about

1894 occur the frequent complaints referred to above.

1890. Hibberd's last remarks on ivies were made in Vol. 12 of the Royal Horticultural Society's *Journal* shortly before his death. The ivy collection in the Society's garden at Chiswick had been attracting much attention and Hibberd says he had been requested to straighten out the nomenclature for many of the plants were labeled with their old names. We are concerned here with his description of our plant only; "*Cinerea* is an Asiatic form of *helix* of rather tender constitution. It is distinct and pleasing and peculiarly interesting in growth on account of the sharp side lobes subsequent to the growth of the leaf to normal size. The colour is dull green with a shade of grey, in some circumstances giving the plant the appearance of having been dusted with ashes. In a cold climate it suffers from frost in winter, but is hardy enough for all purposes. Contributed by Mr. Fraser as *Himalaica* and by Mr. Turner as *Himalaica*. Syn. *Chrysocarpa*, *Baccifera lutea*, *North Indian Golden*, *Cuneiformis*." (R.H.S. *Jour.*, Vol. 12, 1890; p. 390.) Why was not "aurantiaca" listed as a synonym? From whence did "cuneiformis" come? I can find no other mention of it and conclude it was a catalog name—unless Hibberd was striving to be facetious. And why is the issue still confused by listing names of arborescent forms among synonyms of scandent forms? It should also be noted that Turner, the man who bought Hibberd's collection in 1870, was still, after twenty years, using the older name "himalaica" in disregard of Hibberd's innovation.

In this same year E. A. Carrière published a list of ivies in *Revue Horticole* (1890; p. 162). In passing it may be of interest to note that Carrière and André were joint editors of *Revue*

Horticole for many years and that both names are perpetuated in several of our finest garden plants, notably *Crataegus* x *Carrièrei* and *Clematis* 'Mme. Edouard André. In this article Carrière merely lists and describes the plants under the names they bore in the collection of Honoré Defresne, a horticulturist of Vitry and does not make any effort to correct the nomenclature or to verify its authenticity. This fact should be remembered by students when reading the reference to this list, for Schneider, Tobler and some other writers refer to it in a degree far exceeding its value. From the meager descriptions the names which clearly indicate our plant, or may be meant for it, are "chrysocarpa," "aurantiaca," "aurantiaca fructu rubro" (these listed among scandent forms) and "himalaica" (among arborescent forms). There is no mention of "cinerea." As "poetica" is given we may conclude that he did not mean that form by his "chrysocarpa."

1894. The Kew Handlist of 1894 gives "aurantiaca" but not "aurantia"; as Nicholson was a Kew man this would indicate the later spelling to have been a misprint. The list also gives "cinerea" but not "himaliaca." As Kew lists only such names as they consider authentic the compilers evidently looked upon "aurantiaca" and "cinerea" as two distinct forms.

1902-11. In the early years of the twentieth century three small volumes on climbing plants were issued in England: The Book of Climbing Plants (1902) by S. Arnott, in the Handbooks of Practical Gardening series; A Concise Handbook of Climbers, Twiners & Wall Shrubs (1906) by H. Purefoy Fitzgerald; Climbing Plants (*circa*, 1911) by William Watson, in the Present-Day Gardening series or, as it was called in America, Garden Flowers in Color series. In all

three the space devoted to *Hedera* is quite small; and it is very disappointing that only one lists our plant—and under Nicholson's misspelled name. "H. H. aurantia has greyish-green leaves prettily veined." (Book of Climbing Plants, S. Arnott, 1902; p. 40.)

1909. C. K. Schneider briefly treated the genus in *Illustriertes Handbuch der Laubholzkunde* (1909; p. 421-23) and though giving but a line or two to our plant in the text he shows four leaf drawings of it. On plate 287 the figures *m* & *n* show juvenile leaves and *o* & *p* mature leaves of it. Schneider, as did all prior writers save Koch with his enigmatic "nepalensis" in 1853, considered our plant a form of *Helix*.

1912. It was left to Friedrich Tobler in *Die Gattung Hedera* to definitely establish this plant as a species under the name *H. himaliaca*. (*ib.* p. 67.) One can but regret that this name can not stand for it more definitely places the plant geographically than the more localized *nepalensis*. But being a stickler for botanical rules and priorities I can but bow to their usage; though it does seem unscientific to be able to establish a species upon merely the description of others without having seen living plants, herbarium specimens or even illustrations. As Tobler's treatment and description will be included under the section dealing with the plant as known in United States they are omitted here.

1914-15. W. J. Bean's *Trees and Shrubs Hardy in the British Isles* was issued in an American edition (Dutton & Co.) in 1915, an English edition having been published a year earlier, and as the paging is the same in both I cite from the American edition. Bean completely ignores Tobler's work and raises Hibberd's name of "cinerea" to specific rank without any explanation for so doing. "H. CINEREA, *Hibberd*."

HIMALAYAN IVY. (*H. Helix* var. *himalaica*)" (ib. Vol. I, p. 608) omitting any other synonyms. In his third volume of 1933 in which he brought his work up to date he adds nothing to, nor corrects anything in, what he had earlier written on *Hedera*. The Kew Handlist of 1925 follows Bean; as do such English catalogs as I have seen.

1923. Alfred Rehder in the Journal of the Arnold Arboretum Vol. IV, 1923; p. 250 corrected Tobler's oversight of Koch's name of *H. nepalensis*. "When Tobler proposed his *H. himalaica* he overlooked the fact that in 1853 K. Koch (Hort. Dendr. 284) had already given the name to this species

basing it on the *H. Helix* of Don's Prodrum and Roxburgh's Flora Indica." Tobler can hardly be blamed for this oversight for Koch's name and citations take the space of a mere two lines and, as stated above, Koch never referred to it again although he later wrote more fully upon the genus.

1927. Tobler was quick to accept Rehder's correction for when he published in Mitteilungen der Deutschen Dendrologischen Gesellschaft of 1927 an article on The Garden forms of *Hedera* he made the change in name (ib. p. 9). And unless an even earlier name can be unearthed our plant will continue to be *H. nepalensis*.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

A "Pancake" Garden

Sixteen years ago I started a new garden 100 by 50 feet. In the center I put a bed 80 by 40 for annuals and the like, enclosed by a low clipped box edging. Outside this was a strip of soil one and one half feet wide before the paving started. I had a hunch! Why not edge this with rocks, putting flat rocks a foot apart inside the rock edge and start a rock border. You would think this might be easy. Not so, as it has taken me fifteen years to get it just to my liking!

I began with three each of ten different rock plants and as these grew and spread they formed mats the size of dinner plates. My friends called them "pancakes," and to this day we call it the pancake border. You see really the very flatness of this garden is all wrong for rock plants, for when I water the large center bed the "pancakes" get far too much water. I put in the Gem violas and pinks and other plants of like size but they did not look

right. One day looking at them, I thought—it is a "pancake" border, so I'll keep it flat and out came all the tall plants. I tried dozens and dozens of flat rocks and to make a long story short (ten years) I have settled down to five tried and true flat rock plants. Many nice low things just curled up and died, but these five have liked me, and when a plant likes me, I adore it!

First comes *Potentilla verna nana* a great find with dark green leaves and in Spring, masses of golden flowers.

Second come the thymes, *album*, *coccineus* and *lanuginosus* all forms of *Thymus Serpyllum* and now we have charming seedling thymes of our own.

Third, *Bellium minutum* the lovely little Greek daisy from Purdy. It has a way of blooming itself to death, but it is so lovely I do it over when it passes.

Fourth, *Erodium chamaedryoides roseum* a little pink beauty always in bloom, of which sometimes whole plants die, but I have young plants

waiting to replace the losses as the border needs the pink of the lovely blossoms.

Fifth, *Veronica rupestris* not very exciting, but so sturdy, I always fill all corners with it. It will grow anywhere, water or no water.

I do the border over completely every three or four years, as I love it so much.

The effect, as a whole, of this "pancake" is like that of a flowered carpet, flat, blooming in various colors, covering the entire ground, the flat rocks, and spilling over a bit. It is not only very beautiful in itself, but sets off the center garden and the higher annuals.

Many visitors to the garden pass it by, they do not even see it, but a few flower lovers who do *see* it, get down on their knees to examine the little beauties!

This may not be a very good rock garden, but it may give others an idea which they can develop to suit themselves, and if they get half the fun that I have had with my "pancake," it will be worth while.

MRS. H. C. SCRUTTON,
Petaluma, California.

"Upon a Rock," *Empetrum*

The Greeks apparently had a word for everything. In any case, we have applied their ancient name, *Empetrum*, to an interesting plant. "Upon a rock" aptly describes the usual home of the Black Crowberry, *E. nigrum*. A spreading, Heath-like shrub some four to ten inches high, it makes attractive bushlets in the wild or the garden. This species grows in many sections of the Northern Hemisphere.

The Heathberry, as it is sometimes called, forms a prominent part of Arctic vegetation. I first saw *Empetrum* on the high mountains of New England. As one travels north, it becomes

more abundant and descends to sea level on the Maine coast. Large carpets between the rock outcrops or tufted specimens in the rock crevices are not uncommon. The plants are a pleasant sight at all seasons.

Small, evergreen, needle-like leaves clothe the slender stems. Each Spring inconspicuous flowers of a peculiar type appear in the axils of some of these leaves. Some have only stamens, others pistils, and a few both; this condition is technically called "polygamous." The black, berry-like drupes which mature in July or August are showy and tempting. There are also varieties with reddish or purplish fruit. Although all are edible, they are not very palatable. Their main value to us is ornamental. Plants, covered as they frequently are with hundreds of "berries," are striking.

As you have probably surmised, the Crowberry is valuable in the garden. It is a tractable rock or wildflower garden subject. In a sandy, peaty soil with an acid reaction and a sunny or lightly shaded position with good drainage and average moisture, *Empetrum* makes close mats of attractive green.

WARREN C. WILSON.

The Glandular Birch

If asked, "What is a Birch?" most persons would reply, "A tree." Yet, contrary to the usual opinion, not all Birches are trees! In the far North a dwarf, deciduous shrub which fulfills the botanical description of Birches covers large areas of the Arctic barrens. It is a true Birch.

The botanists have christened this plant *Betula glandulosa*; we probably prefer to call it by one of its vernacular names: Dwarf, Scrub, or Glandular Birch. All three describe some of its outstanding characteristics. The short, twiggy stems have prominent, resin-

ous, wart-like glands. This Birch is usually about a foot high but in protected locations may reach six feet. Its leaves, somewhat leathery and almost round, are very attractive with their coarsely but symmetrically toothed margins. The beauty of this foliage is enhanced by its moderate gloss and pale green color. The flowers, small unisexual catkins and cones, are interesting but not showy.

The Glandular Birch grows from Alaska to Greenland and south to the high mountain tops and cold bogs of New England, thence locally westward to Oregon. Although it is rare in cultivation, and despite its rather unusual habitats, it is not very difficult to grow. A sunny or lightly shaded spot with a mixture of loam, sand, and acid humus and plenty of moisture will fulfill its cultural requirements.

Rhododendron Notes

CLEMENT G. BOWERS, *Editor*

YELLOW RHODODENDRONS

For England and for our Pacific Northwest, and possibly for other mild American climates or sheltered spots where summer heat and dryness can be modified, there is a fairly long list of rhododendron species classified as having yellow flowers, among which several worthwhile sorts might be found which would fit into the prevailing conditions. These species range from dwarf ground-covers, (*R. aperantum* and six others), shrubs up to six feet (including more than 30 species under three feet and 25 more up to six feet), and shrubs up to 12 feet (of which *R. campylocarpum* is purportedly the best example, although there are six others), to very large shrubs or small trees of great tenderness (such as *R. Falconeri*). These are all classed as evergreen or "true" rhododendrons.

Since most of these are tender on the Atlantic seaboard, it has long been the dreams of a plant breeder to cross them with hardy sorts and carry the yellow pigmentation into the hardy hybrids. This may some day be done. At present, however, it seems that the hardier of the yellow sorts are of weak or indifferent color and become even weaker when crossed with non-yellow hardy sorts. Perhaps the best chance of obtaining hardy yellow evergreen rhododendrons exists in the dwarf alpine or rock-garden types. But this does not offer much encouragement to those who wish to obtain yellow color in a type which approximates *R. catawbiense* or *R. maximum* or *R. carolinianum* in character and usefulness. True, there are certain seedlings of the *R. Fortunei* series that are tinged with yellow, and these offer great promise. But nothing

has yet appeared which might warrant the belief that a good yellow color is obtainable. Perhaps the hardiest of the yellow evergreen rhododendrons in the Eastern United States is the Japanese *R. Keiskei* of the Triflorum series which does moderately well around New York City, but which has failed to impress this observer with any special worthwhileness in its pale, dull, smallish, sulphur-green blossoms.

While I will readily concede the value of yellow or yellowish flowers in the larger species, these occur mainly on rhododendrons that are too tender for the United States exclusive of the West Coast or perhaps certain spots in the South. Any that I have observed approaching hardiness for the Northeastern United States, are, like *R. Keiskei*, miserable examples when compared to our hardy yellow azaleas. I have concluded that, aside from those having a yellow tinge or conspicuous yellow spotting on the upper lobe, the search for a good yellow hardy evergreen rhododendron for the Northeast is not worth the effort. Evergreenness alone is not so much to be desired as to make me think the insipid yellowish evergreen rhododendrons are to be preferred to the gorgeous yellow colors that are found in the deciduous azaleas.

So in my search for hardy yellow rhododendrons I am now pleased to turn my attention to the deciduous azaleas. These, of course, are rhododendrons, too, and, aside from the lack of evergreen leaves, some of them are much more like typical rhododendrons than are the forms like *R. Keiskei* and the alpine dwarfs. Many yellow plants of *R. calendulaceum* exhibit round

trusses of 20 to 30 flowers, as typically rhododendron-like in character as the clusters on *R. maximum* or *R. catawbiense*. This same feature occurs frequently in varieties of Mollis and Ghent azaleas having yellow colored flowers. They are tremendously like true rhododendrons in every respect except that of evergreen foliage. Moreover, they are reliably hardy and will flourish in suitable rhododendron soil, wherever there is sufficient water in the summer. *R. calendulaceum* and *R. molle* (or its close ally, *R. japonicum*) will endure sub-zero weather and has repeatedly blossomed for me after winter temperatures which have killed all the flower buds on *R. maximum* and *R. catawbiense*.

Rhododendron calendulaceum (the Flame Azalea) goes from orange-red to pure spectrum yellow and you can find forms of all the intermediate shades if you look for them among a batch of seedlings or collected plants. The pure yellow form is delightful and when planted in or among the evergreen rhododendrons produces an effect that is all that could ever be desired from a yellow rhododendron. To me, it is particularly interesting in combination with some of the very purple or lilac rhododendrons. As I have mentioned above, it frequently develops round flower clusters, but this is an individual characteristic and you must pick out your plants in order to be sure you are getting examples of this form. It is to be hoped that some method of producing own-root plants from superior clonal varieties of this species can be developed which will be commercially practicable. Grafted plants are unsatisfactory and apt to suffer by reason of insufficient passage of water through the imperfect graft union during the growth season in early summer, resulting in death the

following winter. But seedlings can easily be raised and I have demonstrated by controlled cross-pollination experiments that the yellow color of *R. calendulaceum*, when two yellow-flowered plants are crossed and protected from contamination of other pollen by means of glassine bags, will produce seedlings that are 100% yellow; in other words, it breeds true. So there should be no difficulty in producing quantities of pure yellow seedlings of this species if the nurserymen will hand-pollinate like plants and use sterile methods to prevent contamination of the cross. Self-pollination is not recommended, since it is apt to result in feeble plants or no seed at all.

Practically everything that has been said about *Rhododendron calendulaceum* may likewise be said about *R. japonicum* and *R. molle*. In their pure yellow forms they are lovely and subject to the same range of variation from yellow to red, when darker colors are wanted. The flowers, however, are larger and bear fewer blooms to a truss. While *R. japonicum* is purported to be the hardier, it is my opinion that this factor, of itself, is of little concern except in certain individuals that are definitely tender, since I have seen plenty of so-called Mollis hybrids that are inherently as hardy as the best. The matter needs further investigation, since many of the forms of *R. molle*, upon which judgment has previously been based, are grafted horticultural forms which are subject to the frailties of grafted azaleas mentioned in the preceding paragraph. Given own-root plants, proper soil and adequate summer moisture many of these plants appear abundantly hardy.

There are many excellent yellows among the Ghent and Mollis hybrids as well as in the natural species. These are usually grafted, which, as I have

said, leads to trouble in Eastern North America, and we hope another method may be found. One splendid yellow azalea, of the *calendulaceum* type but having a large, wide-open, pansy-like flower, is Nancy Waterer. A double flowered yellow Ghent is *Narcissiflora*. There are many more.

Good summer growing conditions are the secret of success in growing deciduous azaleas. Drought means checked growth and this, in turn, means susceptibility to winter injury. Many hardy azaleas are purported to be tender in regions of hot, dry weather because they die in the winter, although the real injury was sustained in summer. A heavy oak-leaf mulch and a spongy peat soil is the best means of insuring good summer growth. Leave the mulch on the soil throughout the entire year. If you must water artificially, be sure that the water is safe. In many communities the water is hard, and hard water has been known to completely ruin the acidity of a peat bed in as little as two or three applications. Some communities which experience difficulty in growing rhododendrons and other deciduous plants may trace their difficulty directly to the common water supply. A peaty soil and a leafy mulch will obviate the necessity of using artificial irrigation in most seasons.

While on the subject of yellow rhododendrons, mention should be made of the so-called Javanicum hybrids, which

represent a whole race of gorgeous tropical rhododendron, some being epiphytes, and are useful only as conservatory plants. They appear to be little known in this country, but worthy of interest.

Hardy deciduous azaleas may be interplanted with the common sorts of evergreen rhododendrons with no disadvantages, in most locations, and often with desirable effects. The plants grow to about the same stature and the massiveness of the rhododendron leaves dominates the planting to the extent that the foliage of a few deciduous azaleas will not be noticed. In winter, the deciduous plants are likewise very inconspicuous unless seen at close range. During the blooming season, the bright warm colors of the azaleas are often just the thing that is needed to give life and sparkle to an otherwise dull and ponderous rhododendron planting. No rules of thumb can be given regarding the combination of colors, but care should be taken to move out any colors which clash. When yellow azaleas with rhododendron-like flower trusses are mixed into a planting of Catawba or Maximum rhododendrons, the result is all that could be wished for, since the yellow trusses appear exactly like rhododendrons when seen from a distance and give the appearance of arising from the evergreen plants. So long as this is the case, there seems to be little reason to search for a hardy yellow evergreen rhododendron.

Lily Notes

GEORGE L. SLATE, *Editor*

Lilies from Seed

About five years ago I began growing lilies from seed on the principle that time and trouble are good substitutes for money, but also I possessed two very vigorous and (it now seems to me miraculous) mosaic-free clumps of *auratum platyphyllum*—Then came the American Lily Year Book 1940 with its terrifying information—How to preserve those Auratums and still have some other lilies? I have never bought a bulb since, though I hasten to say I am no fanatic on the subject; there are other ways mosaic may enter, I have seen it on daffodils, tulips, freesias and callas, and there are the boundless possibilities of weeds. Then also one is deprived of many beautiful hybrids, and the species which do not set seeds, or of which seeds are not available. The system, however, has worked for me—were I differently situated as regards time, space and labor, it might be otherwise.

These notes are offered selfishly in the hope that wiser readers will lighten my darkness, for I have worked quite alone, with George Slate's book as my only guide, and fear so one-sided and limited an experiment can at best serve others only as an encouragement.

Encouraging it is, lilies germinate freely and respond consistently to my few, not too difficult cultural rules; this is true of both the "quick" and the "slow" groups I have tried. I have used ordinary seed flats or bulb pans depending on the quantity of seeds, filled with a mixture of sand, peatmoss, and not too much ordinary garden soil; a fine sifting of sand under the seeds, and about a quarter inch covering of peatmoss on top; I have been careful about drainage and avoided drying out.

On the whole I have planted the seeds as soon as received, but the "early" group does best with a long growing summer ahead of it. When the seedlings crowd, they are potted singly, later planted out in cold frames with about the same soil conditions, except that leaf mold and bonemeal have been added, and a much deeper layer of peatmoss on top. There they stay until they bloom. The preliminaries all take place in my greenhouse, this is convenient but I don't believe essential.

Like everyone else, I began with *regale*, *tenuifolium*, *formosanum* (Wilson's variety). Next came *longiflorum praecox*, White Queen, × George Creelman, *candidum Salonikae*, *centifolium*, *auratum platyphyllum*. More recently *tenuifolium* Golden Gleam, *amabile*, *cernuum*, × Maxwill, *superbum*, *Humboldtii*, *auratum pictum*, *monadelphum*.

The white trumpets were all eager and easy in infancy. *Formosanum* will bloom on slender stems in six to eight months, but these blossoms are not much, and I pinch them off as tiny buds; from this time on it increases furiously for a few years, making tall splendid clumps whose successive shoots provide a very long season; in a warm climate it might be a continuous bloomer; then it slowly peters out. I suppose it should be replanted, but it is too easy to start afresh from seed. It is very easy to move, perfectly hardy, but needs to be carefully watched for aphids.

Regale is all that is claimed, but is it graceful? I am especially doubtful about the very lusty individuals carrying a double cartwheel of as many as forty stiff, not over-large flowers. I doubt if I shall ever sow straight *re-*

gale again, its dominating characteristics have appeared sufficiently frequently in stands of its relatives.

× George Creelman produced pure *regale*, improved *regale*, and two nearly identical specimens that till now are the high light of my lily adventure. These second generation hybrids are very robust, growing, when established, over six feet; the stems are as sturdy as trees; the leaves fairly wide, very dark green; the flowers, ten to fifteen in number, of great substance, like parchment, and well spaced in a pyramid. Best of all they carry axillary bulbils, easily grown on and sure to bloom in two years. They are of iron-clad hardiness and do well in any situation with enough sun. If permitted, these lilies will set seeds, they also increase from the base, fortunately not too quickly. They appear to be long-lived.

Centifolium produced varied results. All were hardy, all so far have weakish stems; some are tall with beautiful flowers, some are runts; there is variety in outer coloring and date of blooming, though none are as late as I could wish. Perhaps I did not have seed from a very reliable strain. I suspect flirtation with *regale*.

Longiflorum praecox is well behaved as a young child, but it resents moving from the cold frame; it relishes very rich soil, hot sun and lots of water, wants not always easily satisfied; but it does best in a general flower garden, a rare virtue among lilies; is very beautiful in habit and foliage as well as bloom, which bridges the interval between *regale* and *auratum*. It is perfectly hardy; must be planted very deep or it will produce underground stem bulblets enough to smother itself.

Candidum salonikae is sheer delight, all we have ever thought a Madonna lily should be. Very young seedlings

sometimes damp-off, at all stages it should be watched a bit for aphids and fungi, but about two sprayings will take care of it; otherwise it is there just to be enjoyed. It blooms at the same age as *regale*, but is slower in reaching full maturity.

Tenuifolium is dainty and healthy. germinates very quickly but takes a year longer to mature than does *regale*. It is not long-lived. Golden Gleam has not been with me long but so far acts like its parent.

Amabile in youth behaves like *tenuifolium* but looks different.

Cernuum in youth looks and acts like *tenuifolium*, but is a fragile though not sickly child. It appears to germinate better at a higher temperature than other lilies.

Mr. Skinner's lovely hybrid Maxwill came to me late but should be one's first attempt; it is fully as easy as *formosanum*, and though it will not bloom till after the first winter is passed, then it sends up a proper spike with several blossoms on a strong stem. Though a hybrid the seedlings are absolutely uniform.

Auratum is eager for life, if not suppressed it would produce bushels of seeds, one capsule will about stock an acre. It is in the "slow" group. I have always planted fresh seeds in the autumn; after a while they begin to puff—hold one against the light and see the germ stretching. After some months a short, weak cotyledon appears, often not even rising above its peatmoss cover, but a decent bulb forms and good-sized roots; they must feel the cold of the first winter and then the true leaves will appear, though there are always a few forward individuals who dispense with this and go ahead regardless, and form spikes a year before their brothers. I leave *Auratums* in their original seed containers through

two summers, then pot when they naturally go dormant and plant out in the cold frame the third spring. It may not be good practice, I don't know, the bulbs become rather crowded, and pots and containers have to receive their winter chilling under salt hay in a cold passage, but eventually the larger bulbs can be planted deeper. I have so far only had *auratum pictum*, and *auratum platyphyllum*, this one from three different sources. All behave exactly alike; they are so reliable it is comforting always to have a pan of them around in some corner, like a teakettle on the stove.

Superbum and *Humboldtii* are my first Americans, both very slow. It is true I dare not investigate too often, but I have never seen the cotyledon; it is as though the bulb developed right inside the seed, and this only after about six months.

Monadelphum is a non-conformist. My first seeds looked good and came from an excellent source: exactly nothing happened. The seeds were gen-

erously replaced. I began over again with even greater care: no result. I changed the source of seeds: continuous erratic germination, at all temperatures from 50 to 100 throughout the year, and always first a small true leaf. Owing to false starts these babies have not been with me long. They seem healthy and willing, the older ones show some resemblance to little *candidum*, and their places of origin may not be very far apart. Has hybridizing ever been tried? Is such another work of art as *Testaceum* a possibility?

This is all I know. Please may I beg again for advice, and information that I do not even know how to ask for.

It is said that *Sargentiae* under some conditions sets seeds? Does *Brownii* do so? *Rubellum*, *japonicum*, *Wardii* do seed, but are the seeds procurable, and how should they be treated? What of the tender exotics, *neilgherrense* and *nepalense*?

ALIDA LIVINGSTON,
Oyster Bay, L. I.

Narcissus Notes

B. Y. MORRISON, *Editor*

Narcissus for Naturalization

I have tried many of the newer daffodils which have become plentiful since the quarantine has been lifted and have found the following satisfactory for naturalization.

Mme. Krelage, Croesus, Helios, Nettie O'Melveny, Silver Star, Diana Kasner.

These seem to thrive as well as many of the older varieties, in fact, Helios gives a more striking effect than any other daffodil of its season.

Lucinius is a lovely thing but doesn't clump up as fast as above mentioned.

Yellow Poppy gives a different color

effect. With me Firetail is indispensable.

Most of the new poets seem to do very well but in mass effects they show no better than the older varieties.

I am trying many others but haven't had them long enough to know how they do without frequent division.

I haven't mentioned any of the yellow or bi-colored trumpets. I don't care for trumpets much for woodland planting excepting, of course, Queen of Spain which is perhaps my favorite of all daffodils for this purpose.

CARL H. KRIPPENDORF,
Ohio.



Mr. Krippendorf's plantings.

The Daffodil

This passage from that ever-readable book "Pages from a Private Diary" by H. C. Beeching, Canon of Westminster, should be of interest to all who grow the daffodil.

"Everything about daffodils is interesting. The name is one of the prettiest corruptions possible. It ought to be 'affodil' as it comes through the French from 'asphodel' but the parasitic *d* is a great improvement. For some time both forms were in use: affodil for what we now call asphodel or 'king's spear' and daffodil for the narcissus. The poets have liked both the word and the flower."

For more years than I can count I have grown a few daffodils; usually at first the commoner kinds like the now-tiresome King Alfred and Sir Watkin, then various species and named varieties from the great firm of Van Tubergen in Holland.

I keep a rough garden notebook in which great occurrences only are set down. One of these was in September, 1939, when there arrived from the kind hand of Mr. Guy Wilson of Broughshane, Ireland, a marvel of a present of 200 glorious bulbs of his supreme daffodils. Perhaps he was moved to send them because I had written him of my delight in the names he or others had given them—beautiful names, full of meaning or of association. (I could not imagine Mr. Wilson bestowing on any fine flower the epithet of "Dream Girl"!) The bulbs had first to repair to Washington for inspection and treatment, but the next spring was awaited with breathless interest. Only seven flowered out of the twenty-nine varieties; but they were sufficient to show the quality of the flowers. The next year some twelve or fifteen appeared, and then in the year following twenty-one. That is the largest number thus far out of the total sent.

Then in 1940 came another of these glorious gifts—this time from Mr. Morrison himself—forty-eight varieties from his garden in Takoma Park. Every one flowered in the following season; beauties all. What generosity this was for the delight of the eye and of the gardening mind. As this garden grows older it seems to grow smaller, for where I placed these last-named daffodils roots of great lilacs began—as the man we knew in Michigan once said, to *encrouch* upon them—and this year we have had to transplant to a more open spot. But every bulb bloomed, and great has been my pleasure in them. Also, from another friend came February Gold, the earliest one I have here—possibly because of its position, too—while a mixed bushel from the Misses Harris of The Plains, Va., do wonderfully on a sunny slope below old damson plum trees, increasing with every year (although we actually run the mower over their leaves while still green). Each year I am filled with thankfulness for the blessing of such presents as these. Is there anything to equal a living, growing, redoubling gift?

With every spring I am able to send to certain city dwellers boxes of daffodil buds which, after two days' imprisonment in the U. S. post office, will always open when received. Every year there is the greatest heavenly names ring in the mind like chimes of sweet-toned bells. Polar Sea, Still Waters, Quartz, Aleppo, Killigrew, Fortune, King of the North, Kandahar, Godolphin, Cocarde, Tenedos; they are like those "seven sweet sympathies" of the Rosetti poem. My thanks go out again with each successive spring to these two friends who have shown me such daffodil kindness, one in Ireland, one in America.

The daffodil Shows of the Royal Horticultural Society in London have

continued, war or no war. Those in our own country, especially in Virginia and New York, have been truly notable. I remember Mr. John Wister as the high priest of many such shows. Perhaps the Garden Club of Michigan in Detroit was the first mere garden club to use in its small daffodil shows twenty-five years ago the classification of the Royal Horticultural Society. I think that group continues this. I have long maintained that a great international horticultural Society, such as that in London, was one of the surest paths to peace and goodwill among men; and I would urge more American memberships in this British society, more reading of its monthly Journal, more visiting of Wisley and of its constant shows in Vincent Square when such visits again become possible. The Society is truly international in membership, as all botany and horticulture are in scope, memberships are a guinea a year, and any interested person may become a Fellow by sending that sum to Vincent Square, Westminster, London W. 1.

Suddenly becoming personal, may I recount in these rather scientific pages a little incident in Holland, in the year 1925 I think it was, when I was there to serve on the Jury of the International Flower Show at Haarlem (and *this* is the international cooperation in which I most firmly believe). I was to do some professional work in writing descriptions of daffodils. A few important growers, including Mr. deGraaff of Leyden, had staged many new varieties for me to discuss; but as I sat down at my desk a group of the growers, standing in the doorway, said, "Before you begin we should like you to look at these flowers and say which you think the outstanding one." I cast a quick eye over the beautiful things before me and in an instant had singled

out a fine specimen with pale yellow perianth and much apricot in the trumpet. "That," I said, "is the one I like best." The fine Dutch growers looked at each other, smiling. "That one," said they, "we had already named for you."

A word as to the use of the daffodil in the garden. These lovely flowers can hardly expect a formal use, a setting in lines or in orderly regiments; they "haste away so soon"; but where they prosper and look their best is in long, loose drifts of colonies on slopes and under trees. Witness the beautiful photograph of William Robinson's daffodil plantings at Gravetye in Sussex, that much-printed photograph; or the nice effects in certain Long Island gardens where daffodils flourish under the young foliage of the white birch; or in the charming plantings of Mrs. Francis Hall, near Harrisburg, Pa. Here there are thirty-nine varieties or species used and these flower from late March to Mid-May. Long grass conceals later the yellowing daffodil leaves, so that they leave no trace.

LOUISA F. KING,
New York.

Daffodil Notes of the 1944 Show

For the past two years it has been our good fortune to have two daffodil seasons, a prolonged one in Pasadena, where daffodils start blooming in January and continue into April, and a much shorter one in Oregon, where the season starts approximately April 1st and is often crowded into about six weeks. In this, Oregon always reminds me of Scotland. There, in the old days, one found early, mid-season and late varieties in bloom together at Brodie Castle during those gatherings of the Daffodil fraternity which were a regular sequel to the London Show. This over-lap in early, mid-season and late varieties is a great advantage to

the hybridist because of the increase in crossing possibilities.

It is our custom to grow all our seedlings in Pasadena where we have only a small stud of named varieties. The bulk of our collection of named varieties is at North Bank Farm in Oregon, where we also have off-sets of any of our own seedlings judged worthy of observation, as soon as stock permits. This makes it possible to complete one season in Pasadena and reach North Bank Farm with the accumulation of pollen of the season just finished in Pasadena in time to start all over again in Oregon.

This year we arrived there the 13th of April and found the beds in full bloom; not a flower faded and only the latest still to come. It literally gave one floral indigestion; and as for crosses, how can one resist scores of perfect flowers with plenty of pollen on hand?

Although the Daffodils are my husband's special hobby, it is now necessary for me to carry on for him for the duration and I really think he is rather fearful of the results four years hence. He claims we will not have land enough to plant these seeds and seedlings. I am sometimes afraid I have been slightly over-enthusiastic when I remember how Reverend Engleheart used to discourage one from trying to grow more than five thousand seedlings a year.

We have been much impressed with the different behavior of certain seedlings and named varieties in the two localities. One expects a certain variation in perfection from season to season perhaps, but it surprises me to find seedlings which have been found wanting and discarded in Pasadena, producing beautiful flowers consistently in Oregon. Then on the other hand, very nice smooth seedlings in Pasadena are

so rough and coarse in Oregon as to be almost unrecognizable. There does not seem to be any way of predicting how a given seedling will behave in a new locality. This is the case with many named varieties too. I am reminded of the fame of White House in New Zealand. It has repeatedly been judged champion Leedsii at the shows and even Champion of Champions, according to my correspondent, Mr. C. G. Hayes of Invercargill, New Zealand. He can not praise it too highly. Now, White House is a nice flower, but it is far from flawless or best of its class here. I understand that this holds true in England also. Yet it wins all honors year after year in New Zealand against things that surpass it here.

Perhaps the most arresting things in Oregon this year were the Red-Cups. They were simply blazing. Of the newer red-and-yellows, Sudan, Braham and Gibraltar were outstanding. It is hard to see how anything could be more perfect than Gibraltar although it has the shortest stem of the three. If only it had the stem of Peiping or Hong Kong. Otherwise it was vivid, sculptured perfection, and it did not burn. Of the older red-and-yellows, Dunkeld, Caerleon, Carbineer, Market Merry and Rustom Pasha were particularly good. One of the Brodie's older seedlings, Red Ribband, was very impressive and made a wonderful garden clump. It is a very strong and tall deep yellow with a wide, definite red ribbon band at the edge of the straight bowl cup, very bold and telling. Another stunning garden plant was Pierrot. Its perianth is paler than in the others, but the cup is most intense and the reflexed perianth is graceful and attractive.

I hesitate to mention seedlings of our own in this august company, but I noted with satisfaction that one of our

1937 crop was giving a good account of itself. It is not named as yet, so must be simply Number 259, Trevisky $\times$ (Bokhara $\times$ Warflame), the 259 has many good points; good color, adequate stem and a short neck. I remember with even greater enthusiasm a red-and-yellow seedling in Pasadena. Number 288, Stirling $\times$ Cornish Fire. It has not arrived in Oregon yet, but we hope to have it there soon as it is very perfect in Pasadena.

We had an interesting first bloom this year; a small vivid cyclamineus hybrid with the characteristic intense yellow reflexed perianth, but with a glowing solid red cup. This small, attractive thing is (February Gold $\times$ Fortune) $\times$ Pentreath. How potent the cyclamineus strain is to give such characteristic form in the fourth generation. We have raised many cyclamineus hybrids and the percentage of acceptable flowers is so high that I urge beginners to use cyclamineus pollen widely. One can hardly fail.

There was a decided color break among our seedlings this year which may prove interesting. Pepper $\times$ Cornish Fire gave a flower with a pinkish bronze perianth and a brilliant red cup. Personally, I do not care especially for Nanking and similar flowers, but this seedling seemed so much deeper in color than any of that class which we grow that we decided to exploit it to the full and have a large crop of seeds, mostly from its pollen.

Of the red-and-whites, Red Hackle was clearly the pick. It was superb. Its form is reminiscent of Folly, but the perianth is very white and the cup is unbelievably red. It did not burn and was very durable. Cairo was also outstanding and is very late. Mahmoud was beautiful, but could do with a stronger constitution. Khartum and Kilworth finally were very telling, but

the Oregon season was very wet and it took some time for their perianths to get really white.

My own favorites are the whites and pale Leedsii and these are particularly happy in Oregon. It would be impossible to rate them all, there were too many good ones. Perhaps Truth was the most consistently perfect. It is not over-large, but has such finish. I can not find a flaw in it except that it does not like the hot, dry climate of Pasadena. Courage was superb, as were Cantatrice, Ledbury, Trostan, Oslo, Zero and Ludlow. The last named was especially good from round bulbs. Trouseau was lovely, but at North Bank Farm it was not pink this year. I will hope for another time. Content was very nice although I expected it to be more definitely "lemon-ade" colored. Glendalough was certainly a fine strong Leedsii and Broughshane was almost too big. It is a wonderful white and very long lasting. Brunswick, Polindra, White House and Carnlough were excellent and in good number and have been heavily used in breeding. I must not omit White Butterfly which was one of the most charming flowers. It is well named and will make a wonderful garden subject.

There were several very interesting white seedlings of our own. Number 110, a pure white, very flat Leedsii, gave an impression of great roundness. Number 163, Marmora $\times$ Carnlough, was icy white and rather like Oslo. Number 128, Sherman $\times$ Kencott, has quite a good perianth and a really pink cup. This is our best pink to date and it has been consistent both in Pasadena and Oregon. Number 229, Le Voleur $\times$ Pucelle, is a large Leedsii with a white perianth and straw-colored trumpet upon opening, but the trumpet ages pink in a very short time. It is really lovely, smooth flower, but is so

slow of increase that we have been unable to get an off-set for Oregon after three years. We hope to get one this year.

Of the yellows, St. Issey was outstanding. It has given us splendid seedlings. We have a whole series of Aerolite $\times$ St. Issey that are hard to choose between. We have named one of these Temecula and there will doubtless be several others worthy of a name, varying between Incomparabilis and Trumpet. St. Issey selfed has given us the best flower we have raised. It is an incomparabilis and the deepest yellow I have ever seen. We have named it Geronimo.

Stirling has been a wonderful parent. It is a Pilgrimage seedling raised by J. Lionel Richardson. It was so similar to its parent that Mr. Richardson sold us the entire stock. It has given the toughest, strongest flowers imaginable, with tall, strong stems, many with the characteristic pointed double-triangle perianth of Pilgrimage. We have used it in numberless combinations and have many fine seedlings from it.

In Oregon, Balmoral was exceptional. Cromarty and Crocus were also noticeable although Crocus needs a longer stem. The older varieties, Principal and Royalist, were smooth and perfect. I must not forget to comment on Christian and Yellow Moon. Both are small in comparison with the above, but they have great charm, I like them both enormously.

I am leaving out of these notes many splendid flowers which we saw blooming, the poets for instance. But how can one hope to cover such a vast field in such a comparatively short time? Especially since an untimely hot spell put an abrupt end to the season. I found myself with only a hazy memory of the relative worth of many that I had meant to observe more closely. Two of those late varieties were impossible to miss however. Who could overlook Alberni Beauty with its glistening white perianth and the deliciously cool and perfect Cushendall with its wonderful green center? They made a perfect ending to our second season!

MRS. KENYON L. REYNOLDS,
Pasadena, Calif.

A Book or Two

The Border in Colour, by T. C. Mansfield, 1944. E. P. Dutton & Co., Inc., New York City. 236 pages, illus.

It is fortunate that color like music speaks an international language that all may understand and enjoy, and the only regret here is the considerable discrepancy between the quality of the color work and the importance of the text, whose usefulness to American gardeners will doubtless be quite limited.

As this is the third book of a series it naturally follows much the same scheme in handling of its data. About 35 pages of brief elementary treatises on soil, site, maintenance, propagation, and pest control, mainly of interest to the beginner, are followed by 189 pages of what is called a "Glossary," wherein herbaceous garden material is listed alphabetically from Abronia to Zauschneria, with one to eight lines devoted to each variety, part of the information reduced to abbreviation or code. It will

thus be seen that the work is intended mainly for reference rather than continuous reading.

That "East is East and West is West" would seem to be borne out in the selection of varieties for inclusion which, as one might expect, is distinctly British. Many of the items would be difficult or impossible to find in American catalogues.

Some measure of the book's interest to American gardeners may be gathered by considering its treatment of the genus *Iris*. There are 48 *Iris* species listed, but under *I. Germanica* there follows "a list of the horticultural varieties developed from this *Iris*." Of 42 varieties named in this list most are such older things as Alcazar, Aurea, Caprice, Ed. Michel, Gold Crest, etc. The most recent introduction well known to this country is Gudrun, 1930, and the only American varieties mentioned are Afterglow, Sturtevant, 1917, and Quaker Lady, Farr, 1909.

Under *Hemerocallis* we find 5 species included, with Apricot, Golden Bell, Hyperion, Orangeman, Sir Michael Foster and Sovereign as the complete list of "good examples" of *H. hybrida*.

The author would seem to have some strong garden preferences since in contrast to this relative paucity of *Iris* and *Hemerocallis* there are listed no less than 120 varieties of *Chrysanthemum morifolium*, 102 of *Lupins*, 73 of *Delphinium* and 42 of *Dianthus*. Even of *Astilbe* there are 28, but only 27 of *Peony*.

Chief attraction, however, are the 80 fine color plates. The 22 line drawings are more decorative than consequential, but the printing job on the color plates is superb. Labeling of these is unique but somewhat precarious since it depends on a loose-leaf transparent sheet marked with twenty

lettered squares to be superimposed on the color plates to aid in location and identification; precarious because of the ease with which a loose sheet may be mislaid or damaged. And I must confess it is a bit startling to read at the bottom of a plate something like this: *Astilbe hybrida* Fanal BCDFGHKL-MOPQTU, or *Lilium auratum* ABC-EFGHJKLMOPQ. That does seem a bit cumbersome, and perhaps not quite necessary, but the excellence of the color printing may warrant inclusion of this book in any horticulturist's library.

J. M. S.

Commercial Flower Forcing, by Laurie and Kiplinger. 4th edition. The Blakiston Co., Philadelphia, 1944. 598 pages, illustrated. \$4.50.

This useful manual has suffered no major changes in plan or development. It has been brought up to date, however, in order to incorporate data recently available, on gravel culture, fertilizers, temperature control, humidity, growth promoting substances, advanced practices in propagation and similar features. No matter how useful other editions have been, this will replace them all.

Pest Control in the Home Garden, by Louis Pyenson. The Macmillan Co., New York, 1944. 190 pages, illus. \$2.00.

This is a handbook of ready reference, carefully planned for and addressed to the large gardening public. The text is simple and forthright: the many illustrations should be of the greatest value to the readers addressed. If they cannot find help in this for all their major difficulties, there is not much chance for them.

The field covered is restricted essentially to plants of the home vegetable and fruit gardens.

Thomas Jefferson's Garden Book Annotated, by Edwin Morris Betts. The American Philosophical Society, Philadelphia, Pa., 1944. 794 pages, illustrated. \$5.00.

This volume represents No. 22 of the Memoirs of the above Society.

To quote from the Preface: "This *Garden Book* contains the most varied entries of all of Jefferson's memorandum books. The book that began as a diary of the garden became a written repository for numerous interests of Jefferson***.

"The varied entries in the *Garden Book* not only show us what Jefferson was doing and planting at *Monticello*,

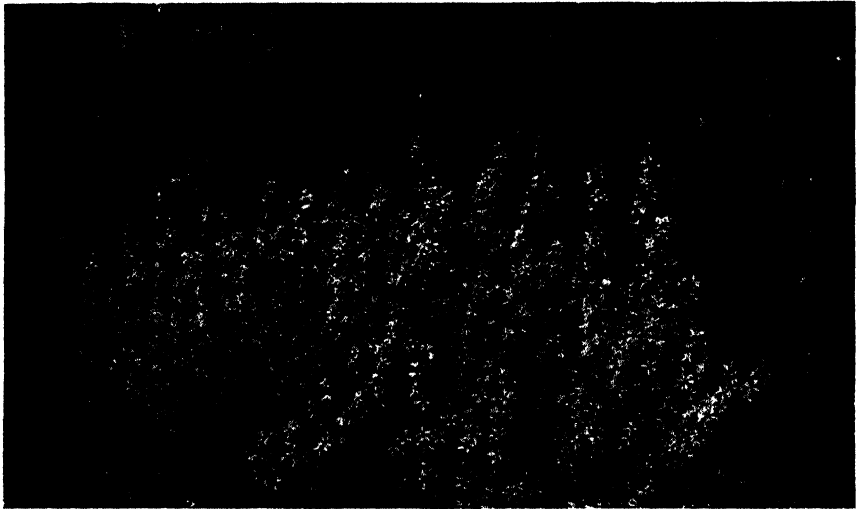
Poplar Forest, and his other estates, but also give us a clue to his interest in introducing new plants and in improving horticulture, viticulture, and many other aspects of the rural life of his time***."

"That those interests at *Monticello* were also tied up with the agricultural and horticultural needs of the United States, is shown in part by Jefferson's attempt to introduce the cultivation of olive trees and dry rice into South Carolina and Georgia***."

And so one might continue, even to the whole of the Preface.

It is a book to read and not read about.

The Gardener's Pocketbook



Prunus Skinneri

Prunus Skinneri (Rehder)

In Western Canada, where the choice varieties of ornamental Cherries and Almonds, that are so largely cultivated in Western Europe and the Eastern States, are not hardy, we are

finding that some of the hybrids of *Prunus tenella* are highly ornamental.

Our photograph shows one of the more recent of these hybrids, having as its other parent the Manchurian *P. japonica*. This hybrid, raised at



Kathleen Marriage

Penstemon humilis

Dropmore, grows considerably taller than either parent; the original seedling being now six feet tall and fully as much across. Both in foliage and flowers it is intermediate between the parents. The fruits, very sparingly

produced, are like small green apricots, half an inch in diameter, while those of *P. japonica* are quite smooth and a brilliant red in color.

The flowers of *P. japonica* are hidden to a certain extent by the foliage,



Kathleen Marriage

Penstemon humilis

while those of the hybrid are all readily visible and a bright rosy-red in color.

It comes into bloom about two weeks later than *P. tenella* and stays showy much longer than the more fertile parents.

F. L. SKINNER,
Dropmore, Manitoba.

The Blues

Penstemon humilis is taking its last stand now (June 27). A few weeks ago the lower foothills, 7,000 feet altitude, were pouring out their blue lavishly from groups of Scrub Oak and Pine.

Yesterday I found a hillside near Divide on the Rampart Range (9,000 feet) where this *Penstemon* flowed over several acres and only stopped where

the hill descended into the valley. Groups of Ponderosa Pine provided a backdrop for this scene, their shadows intensifying the blue around the edges. Lest such a large canvas of all blue surfeit the eye the Master Painter relieved it with occasional splashes of the most vivid scarlet, using Indian Paint Brush (*Castilleja collina*). Words are inadequate; and to photograph this blue and scarlet combination? Just try it! How to catch on any film the clear crispness of the air, the song of the meadow larks, and across the valley, the huge bulk of Pike's Peak, the wrinkles on his face still filled with snow.

To enjoy this breath-taking beauty it is only necessary to leave the trans-continental highway, number 24, roll



Kathleen Marriage

Castilleja collina

under a rather forbidding barbed wire fence, walk a few hundred feet up to the brow of the hill, when suddenly at one's feet, there it is.

To grow Rocky Mountain plants in the garden only one bit of information is really essential. Are they found on a north or south slope? There is a wide variation in conditions between the two. Both slopes are porous gravel and rock, the south having meagre soil, if any, the north having surface humus in varying depths according to the snowfall, and consequent vegetation.

This hillside of *Penstemon humilis* faces south, is too poor in soil to grow decent grass, hence the opportunity for flowers. The ground is about half covered with the glossy basal leaves of penstemon. The next scene on this hill promises to be spectacular and different, for scattered thickly among the flowering penstemons are plants

in bud of *Aragallus lamberti*, a "loco" which will make a big splurge in rosy purple. But to get back to our garden. Most of these south-slope things propagate more or less readily from seed, and will grow and bloom well in the rock garden if drainage is adequate. They all hate a damp collar when they have finished blooming.

The Scarlet Castilleja, like its sisters, is parasitic, or partly so, which necessitates supplying its host. The sure way is to cut about a square foot of sod containing the plants surrounding the Castilleja, fasten it securely in moist burlap, and keep it moist till planted. Keep to the Zombie rule, only two to each person. One botanist suggests that a *Chrysothamnus* is a host for this *Castilleja collina*. Will someone who has time and patience please sow seeds of both together and report results?

KATHLEEN MARRIAGE,
Colorado Springs, Colorado.

"It's Alive."

Without any fear of contradiction we nominate the subject of our present illustration as the oddest of odd plants, at least among those growing in the Strybing Arboretum and Botanic Garden at Golden Gate Park. At first glance it is indeed difficult to tell what it is, or whether it is indeed alive at all. This is *Homalocladium platycladum*, also known as *Muchlenbeckia platyclada*, both names a good mouthful, perhaps designed to discourage beginners of the study of Botany, but scarcely easy to remember. The common names "Ribbon-bush" or "Centipede Plant" help very little, but it prove interesting to know that this is related to the Buckwheats, and that the genus *Muchlenbeckia* includes the New Zealand "Wire-vine," (*M. complexa*).

Our picture clearly shows the queer flattened stems that function as leaves after the true leaves have dried up and fallen off. A few of these true leaves may be seen too, but are present only on young shoots during moist seasons.

The main interest of this plant though at this time arises from the fact that it is the only native to the Solomon Islands that may be grown out-of-doors here without serious frost-injury through most winters. In Southern California this plant is frequently grown for covering banks, or as an informal hedge. When covered with its small red, berry-like fruits the plants are quite ornamental. Propagation is easily accomplished by rooting cuttings in a warm greenhouse.

ERIC WALTHER,

Supervisor of the Strybing Arboretum and Botanic Garden,
Golden Gate Park, San Francisco, Calif.

Two Malpighias

Malpighia glabra L. "Wild Crape-

myrtle." This interesting species belongs to a family represented by some 40 species throughout the lower Gulf Coast region and into Old Mexico, as well as near by islands, where it is represented by the indigenous Barbados Cherry, *Malpighia glabra undulata*.

In gardens of the South this charming shrub forms a low dense mass of glabrous foliage; brown bark and withe like branches, crowned throughout the summer months by axillary cymes of attractive rosy pink flowers, somewhat resembling Crapemyrtle (*Lagerstroemia indica*) which are followed by bright scarlet fruits, resembling ripe cherries spoken of as a "delicious acid fruit."

It may be interesting to note, that while this plant came to us as *Decodon verticellatus*, the writer was approached by Miss Alice Eastwood, in the Academy of Sciences in Golden Gate Park, who asked if my name was Teas, and remarked that she had received a botanical specimen from some one else, who in turn had received the plant from us as *Decodon verticellatus*, which she stated was incorrect, and held in her hand herbarium specimens of the latter, but identified as *M. glabra*. Some years later I discovered a very upright growing form in the gardens of Corpus Christi, Texas, and on investigation learned that this upright form is the type, *M. glabra* and that the one generally found in cultivation is the variety *undulata*.

This latter form lends itself admirably to forming formal hedges and may be clipped into perfect shape at any desired height and yet be trained into columns, or arches of formal outlines, with equal grace and most pleasing effect. The upright form is equally pleasing as a rather neat slender upright growing shrub producing masses of attractive flowers and red cherries



Eric Walther

Homalocladium platycladum

[See page 72]

throughout the summer months.

These shrubs deserve special mention and should find a useful place in the gardens of the South, as specimens, mass plantings or trained to develop accents in those weak spots, which frequently give grave concern to the builders of gardens.

Malpighia coccigera — (berry-bearing) from the West Indies is a charming little evergreen shrub with small spiny Holly-like foliage, virtually covered at frequent intervals with attractive light pink flowers, followed by showy scarlet fruit, like ripe cherries.

As a pot plant, it grows in tree form like that of a picturesque old New England elm, with drooping branches, yet only a foot or two in overall height. While rarely seen in garden collections it is recommended in Florida for hedges. It is conspicuous for its unique individuality and charming habit, and elicits many compliments from visitors.

EDWARD TEAS,
Houston, Texas.

FROM THE MIDWEST HORTICULTURAL SOCIETY

Viburnum Carlesi

One of the most useful viburnums is *V. Carlesi*. This *Viburnum* with its clusters of fragrant flowers, blooms here about the first of May. The scent of the flowers is delightful, and the effect of the pinkish clusters on the plants is good.

After the flowers have gone this is a fairly coarse shrub of medium stature. It is suitable for mingling in the mixed shrub border. Like the other viburnums it is not particular in its cultural requirements. The foliage is dark and green and rugose, reminding one of its relative *V. lentago*.

There are improved varieties of this species appearing on the market which differ in flower color and fragrance and some other minor characteristics.

Price and preference would determine the selection of these.

There is always the problem of how to handle a coarse-leaved plant. While exceedingly beautiful in flower the wrinkled foliage is apt to be quite bold in many situations. As suggested above it seems best to use this as a component of a mixed border where the foliage can serve as a foil for either smaller leaved or yellowish leaved plants.

Syringa persica

One of the interesting developments in recent years has been the appearance on the small plants of *Syringa persica*, Persian lilac, at roadside stands. They are seen as small balled plants three to four feet in height and in full bloom. While this treatment of nursery stock leaves much to be desired yet this has served to disseminate the species quite widely. Being of a robust nature probably most of the plants so handled, and frequently mishandled, have survived.

This, in my opinion, is the best lilac for the home garden. Its medium stature, precocity of flowering, and shrub-like habit are all much more desirable in a small area than the common species. Immediate effects are obtained with the plant. As a source of cut flowers the numerous branches are excellent.

In large gardens where the choicer sorts of French hybrids may be grown for effect the use of this in a cutting garden would doubtless be well worthwhile.

The culture of this is not exacting. Pruning can be done at flowering time and serve a double purpose.

There is some variation in the flower color and plants can be selected that have pinkish tints and others that are deep purple with the majority being a good lilac. Some nurseries are offer-

ing such color selections, while a pure white is offered at others.

This species is not at all new to this region. It was widely used in plantings made more than forty years ago. However the roadside merchandising of this plant within the past half dozen years has been significant in making it one of the common garden plants in this region.

Ulmus glabra Camperdownii

The use of horticultural oddities has resulted in the overdoing of some types of material such as the globular small trees. In this region the ones usually encountered are the weeping mulberry frequently pruned to a globular or canopy-like head and the umbrella catalpa. Both of these have been used too much as accent plants and have tended to discourage the correct use of plants of this type. The mulberry, unless frequently trimmed, grows quite long and strategy and fails to be symmetrical, while the coarseness of the catalpa foliage is a drawback in small or intimate gardens.

One tree which fulfills the purpose of an accent without the obvious drawbacks of the previous two is the umbrella form of the Scotch elm. The foliage is very similar to that of the native elm. As seen in this region this elm is topworked on native elm at a height of about six feet. The branches are rather stiff and spread out in a globular head that stays within reasonable limits without too much attention. Occasional pruning preserves the compactness of the head.

This plant has been quite extensively planted at railroad stations along the northern suburbs of Chicago and also appears in choice plantings in gardens throughout the region. Its hardiness is unquestioned and its adaptability is as great as that of the American elm.

Its use should be confined to rather

formal areas where small symmetrical material is desired. Whether all of the material in this region should be referred to the *Camperdownii* is a question that is undecided. While all of the material has been called this variety in conversations there is some question in my mind as to whether this has been entirely correct or if some of the material is not variety *pendula*. Due to the wide scattering of the material I have not compared all of them critically for varietal differences.

FILDRED GREENE.

Why is a Fuchsia?

This article prepared by Miss Alice Eastwood, California Academy of Science is reprinted by permission from the publication of The American Fuchsia Society, Bulletin, 44-7, July, 1944.

The Genus *Fuchsia* was named by Plumier in honor of Leonard Fuchs who was born in Bavaria in 1501. He was not only the most learned botanist of his time but was also a physician so eminent that he was invited to become physician to the King of Denmark, but refused. His most important botanical work was a beautifully illustrated herbal which dealt with about 400 German plants and 100 from foreign lands.

The first fuchsia was collected in the West Indies by Father Plumier of the Order of the Little Brothers and named and illustrated by him in a precious old book, the title of which is "*Nova Plantarum Americanarum Genera*" by P. Carols Plumier. In his preface he tells of his innate desire to explore from early childhood and that these distant lands drew him not for merit, fame or riches. He could leave his home and friends, undaunted by the stormy seas, the marine monsters, the forbidding mountains and the inhospitable and fierce natives. He emphatically asserted that God called him to explore these islands. This book was published

in 1703, fifty years before Linnaeus established the binominal nomenclature and at that time each plant had but one name. If there were several of the same kind a brief description of each was given and later some one of the characteristics was chosen for the specific name. As he had found only one fuchsia which he described as with three leaves and red flowers, Linnaeus named it *Fuchsia triphylla*. Besides Fuchsia some of the well known plants of the West Indies were named and illustrated by him in this old book.

The English pronunciation is as if it were spelled fushcia and that has become the common pronunciation. In German it is pronounced as if spelled fooksia. According to some authorities that should be the scientific pronunciation.

The fuchsias are members of a large family of plants, known commonly as the Evening Primrose Family. This family is especially common in the western hemisphere and is notably represented in our gardens not only by the fuchsias but by some of the most beautiful and widely cultivated annuals, such as Godetia, Clarkia, and the Evening Primrose. The magenta-flowered fireweed, also called willow-herb, is the most widely spread member of the family. It is known as fireweed because it springs up abundantly where forests have been destroyed by fire, and the name willow-herb arises from the tuft of hairs on each one of the seeds which, like the seeds of the willows, are wafted like little parachutes through the air to the place where they can sprout and grow.

The members of this family are on the plan of four, with four petals, four sepals, four or eight stamens, and the seed vessel below the calyx. All but the fuchsia have a dry seed pod, that splits when ripe into four parts. The

fuchsia is the only member of the family that is a shrub, has the fruit like a berry, and a calyx colored like a corolla.

Some are natives of Mexico and these generally have small flowers, like *Fuchsia thymifolia* and *Fuchsia arborescens*. Those of the *Fuchsia triphylla* group are from the West Indies, but most of the species are from South America, chiefly from the upper altitudes where the climate is temperate.

Galium verum

Among European introductions that have become so thoroughly acclimated in this country as to be generally considered natives (even to being weeds), is the yellow "Ladies Bedstraw"—*Galium verum*.

Bailey says of it that it is now a weed in fields of our Eastern coast, but one can go further, for it has crept up into the slopes of the Blue Ridge Mountains, and now and then into a garden. There it has proved its worth to such a degree that the wonder is that it is not more widely known and used.

Botanically, Bailey says of it:—"Perennial from a somewhat woody base, glabrous and smooth; or the edges of the leaves roughish: stems decumbent or ascending, tufted, 1-3 ft. long: leaves in 8's or 6's, linear $\frac{1}{2}$ -1 inch long, bristle-tipped, panicle ample, its lower branches exceeding the leaves: flowers yellow, blooming all summer: fruit small, smooth."

Translation of this into garden language can give the over-busy (possibly lazy) amateur a more enticing picture of what a high-ranking addition it is to either the herbaceous border or the rock garden.

The tiny, lemon-yellow florets are borne in masses of fluffy, dense, 6-8 inch panicles, growing so profusely that they make a sheet of color for about

six weeks. The stems, clad in light green, small, narrow leaves are prostrate for about half their length, becoming erect for 12 to 15 inches, the root stock is spreading, though not dangerously so, and easily controlled, but growing fast enough to soon clothe a bare spot. One of its greatest assets lies in the fact that after blooming it shows no untidiness of dead bloom that must be cut away, this owing to the diminutive nature of the seed pods; and the whole plant at once acquires a soft, clean green that is a perfect ground cover. Furthermore, as a cut flower, it is invaluable. It is indifferent to drouth and heat, or to temperatures as low as 15° below zero.

VIOLET NILES WALKER,
Woodberry Forest, Va.

Amaryllis Experiment Growing Them Outside in the Southwest

My experimentation in growing Amaryllis outside began more than eight years ago in the semi-arid region just south of Oklahoma City. The real seed of my experimentation enthusiasm began, however, in 1936 when I had the pleasure of witnessing real Amaryllis magnificence at the Department of Agriculture's Amaryllis show in Washington, D. C.

It would be impossible for me to try in words to reproduce my reaction to that display. I knew that the flower was being hybridized extensively and that selective breeding had made great strides in recent years but seeing in reality such dazzling beauty was a rare revelation to me. It was as if I had been dreaming a story and there it was before me, dramatized in technicolor.

Even before I had "drunk my fill" of that Amaryllis show, I sought out the Superintendent of Greenhouses and Grounds. There were hundreds of

questions I wanted to ask him about their care, soil preparation and all. I wanted to *grow* Amaryllis. Not only that, but I wanted to grow them in my *outside* garden.

I returned to Oklahoma with 4 trial bulbs and carefully planted them in 6-inch pots of soil composed of sand, well decayed dairy barn manure, and some good garden soil. They thrived apace.

Next Spring, a year later, I planted them outside, one bulb in full sun, the others in partial shade. They were planted perhaps two and one-half inches below the ground and were mulched just a little. To my amazement, all bloomed nicely and produced seed from hand pollination. Alas, however, I was set back again that winter to the beginning of my experiment, because all bulbs were winter killed.

That experience taught me lesson number one and I concluded that deeper planting and heavier mulching might be the rebuttal for those periodical, roaring "Northerners" which bring unannounced sub-zero temperatures to Oklahoma in winter.

I procured six good bulbs this time and planted them again in pots because that much of the original experiment was good. And I was right because all bloomed with well formed flowers. Two of this second try in particular were beautiful specimens; a pink-striped white one, and a very beautiful red one. Others were cross pollinated. From this second effort came seeds galore which I collected and planted in flats in my small greenhouse (which really is a hybrid in itself, being half greenhouse and half pit). This was about July 15.

Notwithstanding the architecture and condition of my greenhouse, a good germination resulted in hundreds of precious seedlings which lived and thrived in the glass covered beds. I

felt that I was getting a little closer to the answer.

For two winters I kept them there, dosing them occasionally with liquid manure and now, after 18 months, I moved them to their permanent home—outside, to withstand, I hoped, the general climatic extremes and severity of Oklahoma in particular, the Southwest in general.

They were planted in rows, and depending on the size of the bulb, from 3 to 6 inches below the ground, about 8 inches apart in an open frame of scrap material. I found that this "bailing wire" frame also served to contain the three inches of dairy fertilizer with which I mulched the surface. And all during the summer these bulbs were kept well mulched with manure and carefully watered when the soil became too dry for a healthy growing condition.

During the summer and fall the growth was most vigorous, some bulbs having made from 2 to 5 offsets. Then with the first killing frosts, which occur in Oklahoma approximately November 10th, I covered these outside beds with another layer of manure and heavy straw. And as the "nights lengthened and the cold strengthened" I could only hope for the best for their first winter outside.

It was cold for unusually long periods during that particular winter with late killing frosts about the 10th of April. I had purposefully refrained from peeking and when I did remove the mulch, toward the end of April I was amazed and delighted to find healthy foliage tips popping up in every corner of that makeshift seed bed.

That season about 20 of the bulbs bloomed and they were outstandingly nice flowers. One in particular I recorded. It had tall, strong scapes, a wide open flower the color of a silver

gray theatre curtain under a red spot light. This amaryllis was self pollinated.

The bulbs at this time were $3\frac{1}{2}$ years old and they were all from seed. As an interesting sidelight it should be noted here that the bulbs from the same seedling which I kept in the greenhouse for comparison, bloomed just two weeks earlier than their outside sisters. These greenhouse plants were kept in growing condition, except January and February when they rested. And it is interesting to note here that the outside plants bloomed in exactly the same ratio of blossoms per plant, as those hearties who weathered the winter outside.

The first flower to open for the outside debut was the usual chalky white, rose-tipped one with a short tubed, open flower; not very attractive but extremely fragrant. Others, much better followed in the bloom profusion.

Then about the 12th of May, there it was in full flower, the compensation for my three season effort. It was an amaryllis of the daintiest mother-of-pearl shade I have ever seen. On top of this pale pink were splashes of rose, an almost grayed rose, fading into the pink yet making a perfect complement to it. And there were three of them. I was sorely tempted to cut my prize and take it in the house so that I and mine might enjoy every moment of it.

And as it turned out, enjoying its last moments would have been a wise course because that very night the worst hail storm on record turned my garden, amaryllis and all, into something that looked like a plateful of left over spinach.

Of course the curtain fell but the short lived symphony in pearl pink more than justified the effort, which indeed is a point of view that only an amaryllis grower can understand. I

might add that it is well that "hope springeth eternal" because I am figuratively fainting to see what the Spring of 1945 may bring from those seedling bulbs, of which it is now known, can withstand most anything in the way of Southwest's climate severity, except Oklahoma spring hail.

And from the look of broken glass, it is my firm conviction that not even my greenhouse can withstand what we in Oklahoma call "hen-egg" hail.

STELLA HAYDON,
Norman, Okla

—and Here We Have Idaho

Here we have Idaho, where men are men and women are—well, women are the same as they are the world over, just what the men expect them to be. A land of magnificent distances, wide open spaces, hot days and cool nights in Summer with cold and clear days in Winter. A land of mountains and lakes surrounded by the eternal peacefulness of the forests, also a land whose mountain sides are covered in the late Spring with what appears to be drifts of snow, but in reality it is the Idaho State flower, *Philadelphus Lewisii*, commonly known as Syringa.

This very lovely shrub which grows so profusely in the Aspen and Spruce belts of Payette and Sawtooth National Forests and is adaptable to different soil conditions is ideal for foundation planting or as a specimen. There seems to be two types of this, both white-flowered, one blooming with large solitary flower of great beauty, the other being cymose. Both types have a sweet heavy fragrance that rivals Mat-chabelli's. An especially beautiful large flowering form grows in profusion in the canyons along the Weiser River.

The trimming of these shrubs should be done immediately after the blooming season when they can be trimmed and

shaped to suit one's fancy. When planted with other shrubs they have a tendency to grow straight up, but when planted alone are more bushy. Free and easy growth.

If you are looking for something lovely or different by all means try this Idaho State flower, *Philadelphus Lewisii*.

Of native spirea, Idaho has several species, but those that are most often transplanted and cultivated are *Holodiscus discolor*, and *Spiraea Idahoensis* and *lucida*.

Of these three, *Holodiscus discolor*, or as it is most commonly called, Ocean Spray, seems to be the favored one, and the best specimens are brought down from the Salmon River district. The average height is about 6 ft. and when in bloom the many long sprays of feather-like blossoms of creamy tint add distinction to any planting.

Spiraea Idahoensis is a very compact bush of about 3 ft., coming into bloom about the first of June and is a bright rosy-pink in color. While it is hard to distinguish *Spiraea lucida* from the foregoing as to foliage and form of growth, it blooms about three weeks later extending the blooming season well in to Fall. It is also pink in color but not so bright in color as *Idahoensis*. All three are well worth while, doing well with ordinary culture, and should be trimmed heavily in early Spring.

Idaho is famed far and wide for her many varieties of native wild flowers and out of over 2,000 there are no less than 1,500 listed as valuable for home plantings. Many of these, while often difficult to transplant, are easily grown from seed. Hillsides covered with lupines ranging in color through all the shades of blues, patches of rosy purple cleomes and, what we call sand pinks, interspersed with patches of green, form a tapestry-like landscape, that no

one but Mother Nature could create. Beautiful and intricate in design are such displays.

Many rare varieties of the penstemon are native to Idaho, over 20 species growing in and around Midvale. Of these, for our rock garden we would choose first, *Penstemon Hendersoni*, with its beautiful rosy pink flowers. If one would have this low growing, it must be planted in poor soil and kept dry otherwise it will attain a height of about 3 ft. When about 6 in. in height the plant should be pruned back at least half. This variety is one of the most beautiful specimens for rock plantings. Other penstemons well worth getting acquainted with are the species *Scouleri* and *fruticosa*, both being of the shrubby type. The former has flowers of a clear lavender tone while *Penstemon fruticosa* is of a pinkish lavender color. Both are of about the same height, that is from 6 to 8 in., and are June blooming.

There are a number of *Eriogonums* in Idaho, but only one we know of that is ideal for the rock garden and that is *Eriogonum umbellatum*. This is free and easy of growth and is covered through July with a wealth of golden yellow blossoms, being as beautiful and effective as the once so popular *Alyssum saxatile*.

Another yellow blooming plant that we are especially fond of is *Eriophyllum pedunculatum*. This grows to a height of 12 in. having silvery gray foliage and deep yellow daisy like flowers. July blooming. A good companion is our *Erigeron linearis* with its violet daisy-like flowers on 6 in. stems emerging from heavy tufts of foliage. These require only ordinary soil.

In selecting wild flowers for one's rockery, the delphiniums should not be overlooked. The best of these being the most dwarf *Delphinium Leonardi*.

Only 5 in. in height it is of such brilliant deep blue coloring and of such profuse growth, that patches of bloom covering the lava hills can be seen a long distance. The blossom also has a nice white bee.

Another delphinium, that is more rare, but not lovelier, is the *D. columbianum*. This is also found growing on our lava hills, is of deep blue coloring and grows about 12 in. high. These should both be planted in hard rocky soil.

A good blue bell and a bonny one, is *Mertensia Honeri*, which grows 6 in., and of a beautiful clear sky blue in color, often flushed daintily with pink. These should be planted in full sun.

Scotland may have her blue bells but Idaho also has her yellow bells, that seem to be cut out of Idaho golden sunshine.

These are the *Fritillaria pudica* that cover our sandy hills, growing about 7 in. tall, the blossom being a bright golden yellow bell about an inch long. Children roam the sand hills back of our own town here, gathering huge bouquets of "yellow-bells."

For another blue flowering plant, we would choose *Sisyrinchium Idahoensis* (these botanical names!!!!), which is just another name for the lovely blue-eyed grass that covers waste pastures and rocky hills. This has heavy clumps of grass-like foliage covered with bright blue star-like blossoms. Should have heavy rocky soil.

As we cannot go on forever like one of Idaho's many mountain streams we will close our list of selections with the mention of the so early spring beauty *Dicentra Cucularia* or as it is commonly called Dutchman's Breeches. Why Dutchman's breeches, we wouldn't know, as it has racemes of most delicate pink heart shaped flowers and dainty feathery fernlike foliage.

These are for cool shady spots, under shrubbery and secluded nooks or fairy gardens.

We find them growing along our shady mountain streams, often nearly hidden by riotous growing ferns in their extravagant height of six feet, even exceeding that at times until one wonders if they are trying to rival our forests with their feathered greenery. This list of Idaho native wild flowers was selected for their value as plants for your rock garden. If you are looking for something to give it a lift, do not overlook these perennials.

MARY FRAKES THARP.

Colchicums

An ideal way to grow *Colchicums* is to plant them in the woodland as in most other places they are bad garden material on account of their coarse foliage in the Spring. When the foliage is upright it is rather decorative but when it falls over it's a problem on the border. But in the woodland it does not make much difference and large drifts of the flowers in September give a wonderful effect, especially in the last hour or two of sunshine.

The bulbs seem very longlived. I have had clumps down for over 30 years which still throw dozens of flowers. The flowers are also very good for cutting as they will last a week if cut when fresh.

They are obtainable in white and all colors of purple from palest lavender to deep purple.

CARL H. KRIPPENDORF,
Ohio.

Correction

Mr. E. D. L. Seymour informs the editor that the citation given in footnote, p. 234, last issue, is incorrect. Mr. Nearing's work was first reported in *The American Home* April 1939. Close going gentlemen!

Seedling Magnolias

Although the native magnolias have always seeded with more or less abundance, the Chinese magnolias have been less certain in these parts due perhaps to the temperamental early spring weather while they are in flower.

As an early necessity, real or imagined, for a considerable number of both *Magnolia grandiflora* and *virginia* led to the first experiment. Cleaned of their oily pulp the seeds were stratified and germinated well the following Spring; transplanted first to small pots and then to three inch pots with no difficulty save that of keeping the main root from going directly to the bottom of the pot and then through the drainage hole, there was no final difficulty in getting them into the small nursery bed.

This success prompted the sowing of a few seed of *M. salicifolia*, not over five, and an equally small number of some of the colored forms of *Soulangiana*.

Thanks to a complete lack of care, all of the resulting seedlings of the latter died save one, which flowered this Spring and was well worth the waiting although it shamed the gardener for his past laxness. It is much like the beautiful *Alexandrinae*, but is several times darker both within and without. It remains, however, a two-toned flower.

But more interesting than either of these last two, are the plentiful self-sown or squirrel-soon seedlings that are beginning to appear over the garden. Both the aforementioned *salicifolia* and many plants of *stellata* are seeding freely in good years. The common gray squirrel of the neighborhood, never waits for the seeds to mature fully but chatter through the trees, cutting off the cones and chewing their way in to the seeds. Either some are

missed or fall from the squirrels' table, for there is now coming up a plentiful supply, that is plentiful in terms of magnolias, but modest enough as compared with the hosts of dogwood or tulip tree seedlings that infest the garden. As yet, I have not learned to find them in their moment of germination but there are seedlings from more than one year's seedfall.

Several were transplanted this year in soft growth, but with a good ball of earth and took their move without flinching.

It is possible that these seedlings may not make trees as swiftly as a layered branch, the method used for all my *stellatas*, but one can only feel that a plant has truly accepted the garden, when it begins to self-sow.

TAKOMA PARK, D. C.

Fancy Leaved Caladiums

Some time ago there was a note in these columns about the beauty of these plants in the summer window, particularly in reference to those forms, common enough now, which have almost white leaves with a fine pattern of deep green veining.

The plant which prompted this note has been living in the office window for over two years without a change of pot or soil and seem to find life still worth the effort. What we did not know at the time of that writing was that no matter what we might do, the plant would take a rest. This began about November in 1943 with a normal dying off of the leaves. Nothing was done about it except to let the pot stand dry. No record was made of the

time when the new leaves made their appearance in 1944. In the autumn of 1944, however, the dormant period made its appearance as usual and a little careful investigation showed that the tuberous roots looked firm and sound. During the leafless stage, water was given in just enough quantity to prevent the soil from becoming a hard bricklike mass. In January 1945, the first signs of new growth appeared and now in mid-January there are good single leaves from each of five noses. As a reward for all this there will be some good fertilizer applied as soon as we can remember, which gives additional proof of the value of all this as a long suffering window plant.

Winter Boughs

As soon as there have been heavy frosts one may cut branches of such trees and shrubs as make their flower buds well in advance, and these as every one knows will force in the ordinary house temperatures and give a flowering that is almost as good as that on their normal plants.

It has even been noted that nowadays when we do not have such high temperatures in our rooms, the flowers come on more slowly and last far better than in the old days when we "enjoyed" higher temperatures and doubtless drier airs.

Zinnias

Only two persons have written in about the possible participation in a test of zinnias. Unless other letters are received before February 10, this project will be abandoned.

- Chevy Chase (Md.) Garden Club,
Mrs. Frederick W. Connolly, Pres.,
4437 Reservoir Rd.,
Washington, D. C.
- Community Garden Club of Bethesda,
Mrs. Arnold Burr,
Bell's Mill Road,
Rockville, Md.
- Dallas Garden Club (Founders' Group),
Mrs. Sam B. Dickinson,
1218 N. Clinton,
Dallas 8, Texas
- Eagle Garden Club,
Mrs. J. D. Allen, Pres.,
Eagle, Colo.
- Fauquier and Loudoun Garden Club,
Mrs. N. H. Morison, Pres.,
Middleburg, Va.
- Federated G.C. of Cincinnati and Vicinity,
Mrs. Charles Bosworth, Pres.,
2425 Ingleside Place,
Cincinnati, Ohio
- Forest Hills Garden Club,
Mrs. Richard V. Mattingly, Pres.,
3701 Cumberland St., N. W.,
Washington, D. C.
- Garden Center of Greater Cleveland,
East Boulevard at Euclid Ave.,
Cleveland 6, Ohio
- Garden Center Institute of Buffalo,
1500 Elmwood Ave.,
Buffalo 7, N. Y.
- Garden Center,
Youngstown Public Library
Youngstown, Ohio
- Garden Club of Alexandria,
Mrs. Jas. Sherier, Pres.,
725 Kingstreet Road,
Alexandria, Va.
- Garden Club of Ohio,
The M. O'Neil Co.,
Akron, Ohio
- Garden Club of Virginia,
Mrs. Louis N. Dibrell, Pres.,
124 Broad St.,
Danville, Va.
- Garden Club, Woman's Dept. Club,
8-2 Margaret Place,
Shreveport, La.
- Georgetown Garden Club,
Mrs. Carroll Greenough, Pres.,
1408 31st St., N. W.,
Washington, D. C.
- Greeley Garden Club,
Mrs. Asa T. Jones, Jr.,
1703—11th Ave.,
Greeley, Colo.
- Home Garden Club of Denver,
Mrs. William P. Mellen, Pres.,
4864 Tennyson St.,
Denver, Colo.
- Indian Head Garden Club,
Mrs. Frank A. Bolton, Pres.,
Pomomkey, Md.
- Kanawha Garden Club,
Mrs. Ruffner R. Payne, Pres.,
1507 A Virginia St.,
Charleston, W. Va.
- Longmont Garden Club,
Callahan House, Terry St.,
Longmont, Colo.
- Men's Garden Club of Phoenix,
Mr. Maurice J. Bradford, Pres.,
Rt. 1, Box 826,
Phoenix, Ariz
- Michigan Horticultural Society,
Mr. Paul R. Krone, Secy.,
Horticultural Building,
East Lansing, Mich.
- Midwest Horticultural Society,
100 North Central Park Blvd.,
Chicago 24, Illinois
- Northern Nut Growers Assn.,
Mrs. Carl Weschcke, Pres.,
96 S. Wabash St.,
St. Paul, Minn
- Norwich Garden Club,
Ruth T. Kroeger, Treas.,
40 Hayes St.,
Norwich, N. Y.
- N.R. Garden Club,
Miss Essie K. Hurff, Hort. Com.,
Suffolk, Va.
- Ohio Association of Garden Clubs,
Mr. Victor Ries,
Ohio State University,
Columbus, Ohio.
- Rock Garden Society of Ohio,
Mrs. Frank Garry, Librarian,
Montgomery Station Post Office,
Montgomery, Ohio
- Salida Garden Club,
Mrs. John C. Burgener, Secy.,
802 D St.,
Salida, Colo.
- Takoma Horticultural Club,
Mr. Frank L. Pohanka, Pres.,
Silver Spring, Md.
- The Pittsburgh Garden Center,
Schenley Park,
Pittsburgh, Pa.
- The San Francisco Garden Club,
Room 133, Fairmont Hotel,
San Francisco 6, Calif.
- The Valley Garden Center,
2700 N. 15th Ave.,
Phoenix, Ariz.
- The Trowel Club,
Mrs. Robert M. Hinckley,
4655 Garfield St., N. W.,
Washington, D. C.
- Tulsa Garden Club,
Mrs. Thos. G. Leslie, Librarian,
1439 S. Carolina Ave.,
Tulsa 5, Okla.
- Twin Falls Garden Club,
Twin Falls, Idaho
- Wayside Garden Club,
Mrs. S. M. Sisley, Pres.,
2224 S. Indianapolis,
Tulsa, Okla.
- Washington Garden Club,
Mrs. Fred E. Evans, Pres.,
3811 T St., N. W.,
Washington, D. C.
- Woodlawn Garden Club,
Mrs. Allen W. Burkholder, Secy.,
1419 N. Glebe Rd.,
Arlington, Va.
- Woodridge Garden Club,
Mrs. W. Wylie Giffen,
1612 Kearny St., N. E.,
Washington, D. C.
- Worcester County Horticultural Society,
30 Elm Street,
Worcester, Mass

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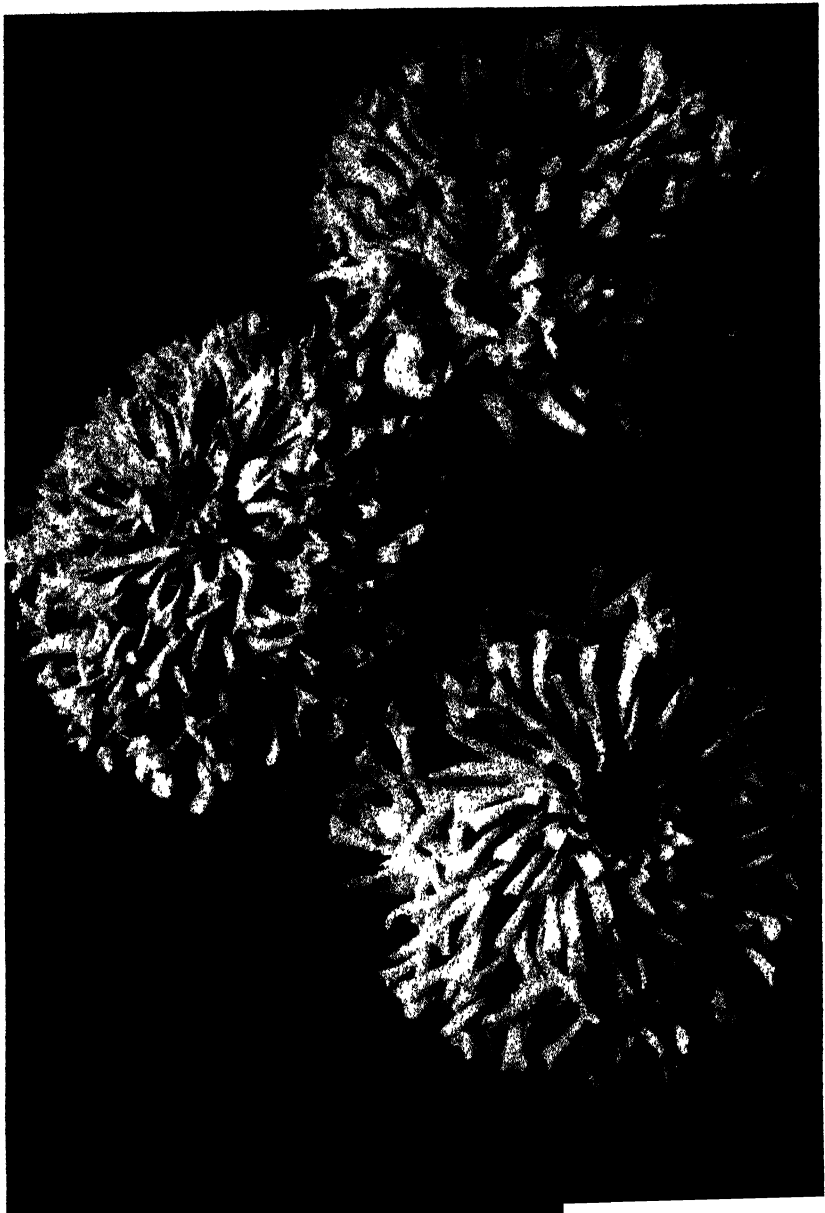
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APRIL, 1945

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Horace McFarland Co.

Fantasy Zinnia, White Light

The Elegant Zinnia

CHARLES WEDDLE*

If you were to conduct a poll to find out which is the most popular annual garden flower in the United States you would certainly get a great variety of answers. When the results were tabulated, probably you would be surprised, since likely it would not be your favorite. So far as is known no such formal poll has been taken, but nevertheless the answer is in the sales books of the seed companies, any one of which will tell you that sales of zinnia seed consistently top those of everything else, and are approached only by petunia and marigold sales.

Surprising as this may seem, there are several good reasons for the popularity of the zinnia. The first of these is that it has such wide adaptability, for there are few areas in the country where it is not grown successfully. Another reason for the great popularity of zinnias is that they are easily grown and comparatively free from insects and diseases. Propagated by large seeds that germinate readily in any type of warm moist soil, the zinnia grows rapidly and blooms freely throughout the summer and early fall. The rank-est amateur has no difficulty with zinnias and the most discriminating professional horticulturist is well rewarded for his efforts in their cultivation. No other annual thrives so well in the hot dry summers common to the United States.

The third factor contributing to the popularity of zinnias is the wide range of colors. No annual in cultivation has such a diversity of colors, and it is approached only by asters and sweet peas, which have limited adaptability in this

country. Furthermore, with the improvement that has been made over the last twenty years, a great variety of flower sizes, flower types and plant habits is now available. The color range contains at least nineteen distinct hues, including white, cream, primrose yellow, buttercup yellow, cadmium yellow, orange, flame scarlet, crimson, maroon, shell pink, carmine pink, coral, spectrum red, rose, magenta, lilac, lavender and purple. In addition, the Navajo strains have two- and three-color combinations of the above hues arranged in attractive concentric circles in the flower head. There are also variegated strains, but these are not very popular.

In the 1910 edition of the *Cyclopedia of American Horticulture*, Bailey says: "The zinnia is rich in shades of purple and orange, but lacks the charming blue and pink of the China aster, and is poor in reds compared with the dahlia." Some of these deficiencies, however, no longer exist. Some of the new pastel mixtures, especially Crown o' Gold Pastel Tints, David Burpee Mixture, and Burpee's Super Giants contain many fine clear pinks. Likewise the Dahlia Flowered and California Giant types contain red varieties which closely rival the dahlia varieties. Not all the colors that occur in a well grown mixture of zinnias occur as straight varieties, but no doubt this will be remedied soon, so far as is possible.

Zinnias are often criticized for their stiffness and coarseness. While this is true to some extent, due to the texture of the flower parts and the precise manner in which the rays (petals) overlap, the later introductions beginning with the California Giants are

*Plant Breeder W. Atlee Burpee Seed Co., Doylestown, Pa.

more graceful. The Fantasy varieties especially are graceful, with their curled and twisted petals, as are the David and Super Giant mixtures, which contain some heads of the Fantasy type, but larger.

All in all, it seems there is sufficient reason for the great popularity of the zinnia.

Like many popular garden flowers, the zinnia is native to the great southwestern portion of North America. The native habitat of *Zinnia elegans* is Mexico. A few species, however, occur in Texas and Colorado. The genus gets its name from Johann Gottfried Zinn (1727-1759), professor of medicine at Göttingen, Germany, who first described it. The wild form of *Zinnia elegans* as originally cultivated is a single daisy-type flower with a high center, similar to, though smaller than the "medicine hat" types that occur occasionally as rogues in modern varieties. The first double forms appeared in 1858 in a planting from some seed received from the West Indies by M. Grazeau of Bagnères, France, and were introduced by Vilmorin in 1860. They were $2\frac{1}{2}$ to 3 inches across with only 5 or 6 rows of rays. How far the present-day varieties have been developed is seen by the fact that they often reach 5 inches in diameter and have from 12 to 20 rows of rays. The zinnia immediately after introduction became very popular, and during the early sixties of the last century was extremely fashionable. Its popularity soon waned, and by the eighties the zinnia was considered an old fashioned flower.

Previous to 1880 the development of *Zinnia elegans* was limited. Bailey states that fixation of the colors proceeded rapidly after the introduction of double forms, but apparently very few separate colors were available before 1894, when at least two American

seedsmen were offering "Dwarf Double" zinnias in the stronger colors, pink and rose being still missing. The "Dwarf Double" varieties were what is now known as the Cut-and-Come-Again type. The Pompon or Lilliput type was also known in mixtures during the eighties. In 1886 the Dwarf Mammoth mixture, the forerunner of the present giant flowered types, was introduced, and by 1904 Peter Henderson listed several separate colors. The only colors available in the Lilliput or Pompon type at that time were scarlet and white.

Other types of *Zinnia elegans* known before 1900 were Tom Thumb (very dwarf) and the Curled and Crested which were the forerunners of the modern Fantasy types.

Zinnia angustifolia (*Haageana*), the only other species to achieve any importance, was introduced in 1861 (single) and 1871 (double). This is now known as Mexicana or Mexican Hybrids. *Zinnia multiflora* (*Z. tenuiflora* Bailey) has occasionally been listed, but has never become important, although it may have been used in breeding.

The GIANT MAMMOTH strain as previously noted was the first large flowered strain to be introduced, and was the forerunner of the other large flowered types. It is seldom offered now. This strain for some time was available in all colors. The flower heads are large (3 to 5 inches across) and often as deep as broad. The petals are broad and coarse of texture and the colors dull as compared with the Dahlia Flowered and more recent introductions.

The DAHLIA FLOWERED strain introduced by Bodger in 1919 marked the first great step in the development of the modern zinnia and the one which started the trend away from the coarse formality of the Giant Mammoth type.



I. Horace McFarland Co.

Lilliput or Pompon Zinnia, Black Ruby

Petals of the Dahlia Flowered varieties are somewhat narrower than those of the Giant Mammoth, and slightly cupped, giving the flower an upright and somewhat stiff appearance. The flower heads sometimes exceed 5 inches in diameter, and are usually deeper than the California Giants.

Good varieties of the Dahlia Flowered type are Canary Bird, a rich bright yellow; Dream, deep lavender; Exquisite, light rose with deep rose center producing a lovely two-toned effect; Maiden's Blush, shell pink; Polar Bear, white; Royal Purple, deep purple; Will Rogers, deep scarlet; and Oriole, two-toned light orange.

GIANTS OF CALIFORNIA zinnias are slightly shallower on the average than the Dahlia Flowered, but are more graceful. The petals are slightly reflexed and are less symmetrical in their placement, and the heads are not so deep. The stems are long and the colors are bright. This is the type usually grown by florists for cut flowers. Several colors are found in the California Giants which are not found true in any other class. Outstanding varieties in this class are Cherry Queen, a bright carmine rose; Salmon Queen, azalea pink or salmon rose; Purity, white; and Rose Queen, deep rose. The Giants of California were introduced by Bodger in 1926.

SUPER CROWN O' GOLD, varieties Desert Gold and Crown o' Gold Pastel tints, may become a new race of large long stemmed zinnias. They are distinctive also for their feature of having an overlay of deep golden yellow on the various colors.

THE CACTUS FLOWERED zinnia is an old type seldom seen now. The petals are quilled by having their edges rolled up, showing the reverse colors and giving a stellate effect to the flowers that, although hard, is pleasing. The reverse colors are dull but often

make extremely attractive, harmonious combinations. This is available only in mixtures, but should be tried up.

DAVID BURPEE and BURPEE'S SUPER GIANTS, introduced by the W. Atlee Burpee Seed Company in 1940 and 1942 respectively, show considerable promise in that they contain some new tints and colors and some forms new to very large flowered zinnias. The David Burpee mixture contains flower heads with petals rolled, curled and twisted not unlike the Fantasy varieties. The petals also have a crepe-like appearance which is attractive and adds something to the color effects. The foliage is peculiarly crinkled.

The Super Giants are very large, with a wider range of clear attractive colors than is found in any other mixture. The form varies from that of the California Giant to that of the Fantasy types. When the colors and types found in this mixture are fixed, there will be a whole series of new colors and types.

The CUT-AND-COME-AGAIN (*Zinnia elegans pumila*) as previously mentioned is the original form of the double zinnia. It is still listed in a wide range of colors, and is quite popular. The flowers are globular and similar to the Giant Mammoth except in size. The plant is well branched and the flowers are numerous.

THE NAVAJO or GAILLARDIA-FLOWERED zinnias arose from crossing *Zinnia elegans* with the Mexican or Haageana types (*Z. angustifolia*). The flowers are about 2 inches in diameter, and the colors are bright, with many two- and three-toned combinations. These are available only in mixtures.

The EARLY WONDER group is the earliest flowering race of zinnias and is said to blossom within 30 days from seed. The plant is semi-dwarf,

and has several stems which have no lateral branches, and the flowers are similar to the *pumila* varieties but looser in conformation. Varieties in this group are Gypsy, burnished orange; Fandango, fiery salmon cerise pink; and Fiesta, deep red. Since the stems do not branch, the period of bloom in this class is short.

The TOM THUMB type is seldom seen and so far represents an ideal that is attained only in a few individuals, namely that of the largest possible flowers on the smallest possible plants.

The SCABIOSA FLOWERED type likewise has not been fixed. The ideal flower form of this type is very similar to that of the anemone-flowered chrysanthemum. The disk florets of the center of the flower are elongated into a tube which is the same color as the rays. Thus, the flower has a cushion center with a few rows of ray florets around the outside. Yellow is the only true color offered in this type.

The FANTASY type is by far the most interesting medium sized zinnia. Although introduced as something new in 1935 it represents an improvement of the old Curled and Crested type listed as early as 1902. The flowers of the Fantasy type are extremely informal due to the rolling, curling and twisting of the rays. The flowers are 2½ to 3 inches in diameter. The plants are somewhat more dwarf than the large flowered varieties, but are strong growing and prolific bloomers. They make excellent cut flowers and are often grown under glass in the spring or in cloth houses in the summer.

Varieties listed are Orange Lady, deep orange; Rosalie, light rose; White Light, white; Star Dust, golden yellow; Pink Frills, pale orchid pink.

Other types in the medium sized group are the variegated type with flowers striped with two colors, and *pumila* Picotee, which has flowers

tipped another color. Although some of the Picotee varieties are popular, none of these types are true.

The CUPID zinnias are dwarf compact plants which cover themselves with small perfectly shaped flower heads ¾ to 1½ inches in diameter, and are very popular and useful garden subjects. Popular varieties are Elf, carmine; Tiny Tim, scarlet; Pixie, yellow; and Snowdrop, white. Red Riding Hood is the smallest in this class and is similar to Tiny Tim in color. The flowers are ½ inch in diameter.

The LILLIPUT zinnias fall between the Cupid and the Cut-and-Come-Again in size. The plants are taller and less compact than the Cupids. A good color range is available in this type.

The *Haageana* or MEXICAN HYBRID zinnia (*Z. angustifolia*) is about the size of the Lilliput type, but has bicolor effects similar to the Navajo type with orange, mahogany red, wine red and yellow markings.

Zinnia linearis is a small single flowered species which is becoming popular. The plant is dwarf with narrow leaves, and the flowers are small orange singles with a delicate stripe sometimes tracing the length of the petal. It is free blooming and makes an attractive border plant.

Zinnias are among the easiest of all garden flowers to grow, and will reward the smallest amount of effort. They respond, however, to almost any amount of attention. They withstand drought but respond to plenty of water. They will grow in poor soil but are at their best in moderately rich soil. Not every garden flower responds in direct proportion to the amount of effort expended upon it, but the zinnia does.

The breeding and growing of quality zinnia seed is a difficult task. The more desirable fully-double forms pro-

duce little pollen and therefore less seed than the singles and semi-doubles. Thus varieties have a strong tendency to revert to the single type. Furthermore, color inheritance is very complex, and pollen is carried long distances by insects. Therefore great care in isolation is necessary to maintain pure stocks. For this reason, the gardener should buy the best seed that is obtainable from the most reputable seed growers. Otherwise the plants may be very inferior, with many single flowers and undesirable colors. This cannot be emphasized too strongly.

Zinnias love sun and will endure considerable heat. In fact, they will refuse to grow if sown before the soil is warm. Therefore, they should be given a sunny location. Sown after all danger of frost is past and when the soil is warm (about May 15 in the latitude of Philadelphia) they will come into bloom early in July and continue to flower until frost. They are especially adapted for sowing among the flowering bulbs for filling in after they are gone.

Although any garden soil is suitable a light well drained sandy soil is preferable. Thorough preparation is desirable and moderate fertilization is usually beneficial. A light mulch of lawn clippings, peat or straw applied early in the growing season often produces a marked response. Soil reaction should be neutral to slightly acid.

The large seeds germinate in four or five days in warm moist soil. If earlier plants and blooms are wanted, the seeds may be sown in the greenhouse or cold-frame, transplanted to 2½-inch pots, and later planted in the flower garden. The plants should not become potbound, or they will become stunted and never recover.

Spacing of the plants depends on the soil fertility and the variety and type grown. The small flowering types such

as *linearis*, *Mexicana* and *Cupid* may be set 6 to 8 inches apart. The *Dahlia Flowered*, *California Giants* and *Giant Mammoths* require 15 to 18 inches.

The soil around the plants should be soaked whenever irrigated. Frequent light watering does little good and may spread mildew. Well-grown plants will require no staking.

With the introduction of improved types and varieties, zinnias are coming into their own as commercial cut flowers. Florists who have difficulty producing China asters find zinnias a welcome and satisfactory substitute. They may be grown in the greenhouse in early spring by sowing the seeds in February or early March in the benches where they will flower during May. Zinnias are at their best here and in the cloth house during the summer. The stems stretch out long and graceful and the flower size is greatly increased. The *California Giants*, the *Super Giants*, the *Fantasy varieties* and the *Cupid varieties* are especially adapted for commercial use.

No insects are peculiar to zinnias, but several common garden foragers attack them. Among these are such chewing insects as caterpillars, grasshoppers, Japanese beetles, blister beetles, and the cucumber beetle. These may be controlled with dust mixtures, including Cryolite arsenicals, or other stomach poisons. Sucking insects attacking zinnias are aphids, leaf hoppers and tarnished plant bugs. White flies and red spiders are often serious in greenhouses and cloth houses. Pyrethrum and rotenone sprays are most effective on these. When they are not available, nicotine sulfate is the alternative. Clean cultivation is important in the control of the tarnished plant bug, since contact insecticides are ineffective and the adult insects winter on rubbish.

Mildew is the most common disease



I. Horace McFarland Co.

Robusta Fluted Zinnia

of zinnias. The first symptoms appear as a grayish white powdery growth on the leaves which may spread, finally causing the foliage to turn brown and

die. Flowers also may become affected. Dusting sulfur is commonly used and quite effective in controlling mildew. It should be applied when



I. Horace McFarland Co.

Scabiosa-Flowered Zinnia, Dazzler

the foliage is slightly moist, directing the dust downward and letting it settle on the foliage below the flowers. If the flowers are covered their color is

bleached. A prepared copper mildew spray, "Sporgo," manufactured by the General Chemical Co., has proved effective at Fordhook Farms, and has

the advantage that it does not bleach the flowers or discolor the foliage.

Blossom Blight (*Choanephora* sp.) often attacks the blossoms during warm moist weather. It is a dark mouldy growth which is more likely to attack the ripe heads, and for that reason these should be removed. Prepared copper sprays and sulfur dust are most effective in preventing it.

Alternaria Leaf Spot or Alternaria Wilt is a relatively newly discovered disease of zinnia, but may become very serious—as serious as aster wilt. Spores of *Alternaria zinniae* are carried in the seed and in the soil, making it easily disseminated and very difficult to eradicate.

The lower leaves are usually attacked first, the younger leaves and blossoms becoming spotted later. In 1944, which was a very dry season at Fordhook, the roots became infected, causing the plants to wilt before any other symptoms were evident. The spots on the leaves are dark brown with purplish borders, and affected flower heads turn brown and wither before they are mature.

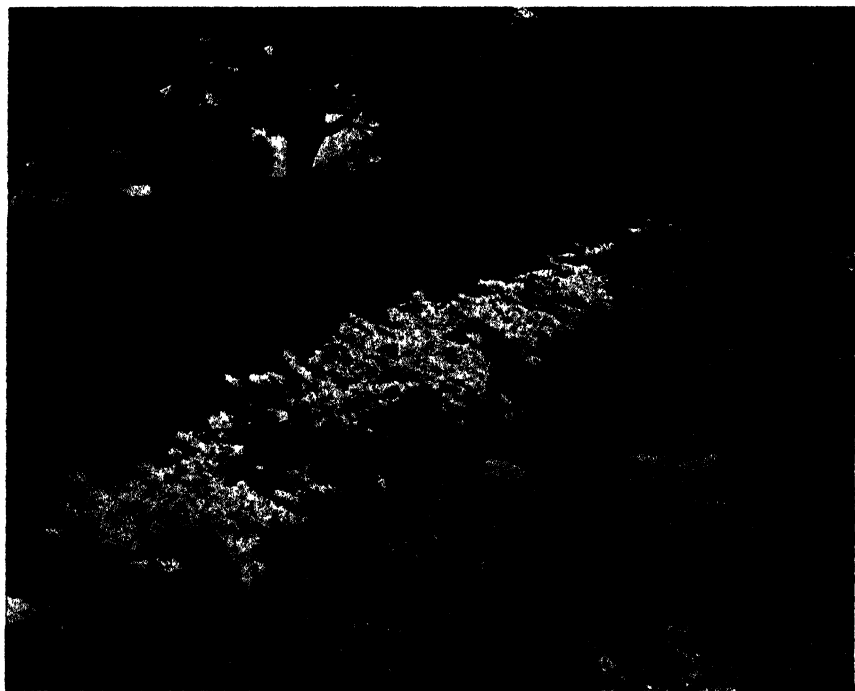
Control hinges upon planting disease-free seed in disease-free soil. This is not easy, for treating the seed in hot water at 121° F. for 30 minutes and sterilizing the soil with steam, formaldehyde or chloropicrin (tear gas) are the minimum operations for absolute control. Two varieties, Cherry Queen and Eldorado, are said to be resistant to Alternaria.

Although this disease is not yet serious because it is not widespread, it is being spread rapidly through plant-

ing of infected seed. It is entirely possible that zinnias may be as difficult to grow in the future as China asters are now. The spread of Alternaria is very insidious because it causes no noticeable damage in the California seed fields. It is thought that permanent control of Alternaria on a national scale could be accomplished if seed growers would treat their stock seed and grow only on clean land.

Although the zinnia has been developed in less than a hundred years beyond all expectations, there are still many things to come in this stalwart beauty. Several colors are missing in the Cupid and Fantasy types, and actually there are new colors possible in all the types. The Tom Thumb type itself is not yet true. Furthermore there will be the whole range of colors to breed in this extra dwarf zinnia. New types are bound to come, for example, Fantasy type heads as large as 5 inches in diameter on long, graceful stems are definitely in the wind. For those who think the Fantasy types too informal there will be varieties with only slightly rolled and twisted petals.

It is entirely possible that hybrid seed may be offered in the near future. Hybrid varieties will be larger and more vigorous, and will contain colors unknown previously except rarely in mixtures. They will be more uniform than heretofore thought possible. The gardener who considers the zinnia too old fashioned or beneath his dignity must be unfamiliar with the newer varieties with their many delightful characteristics. Zinnias are well worth growing in every garden.



Hardy Single, North Star

Garden Chrysanthemums

ALEX. CUMMING

The hardy chrysanthemum is gradually and surely attaining a position in garden popularity close to that of the rose. There is every reason why it should for it is at its very best after killing frosts have virtually destroyed all other flowers. Again, it is inching up "season-wise" so that the day is not too far distant when it will also be an important factor in the summer garden. A hasty review of its development within the last 25 years is offered by way of confirmation.

Professor Mulford of the U.S.D.A. did some good pioneering in develop-

ing earlier hardy kinds—kinds more resistant to both heat and cold. That, too, during a period when the chrysanthemum was not a satisfactory garden plant color-wise or culturally. Of his good introductions, I think the brilliant Algonquin, very early, very hardy—and withal a good honest growing plant—registered a real advance. All chrysanthemums up to this time were of the Hortorum type. New kinds were simply improvements, but none radically different from the type. Somewhat different in habit among these Hortorums was the widely pub-

licized Azaleamum. Its early-flowering trait and moundlike or cushion growth plus its ability to thrive under average garden conditions filled a definite need. Since the introduction of the Azaleamum many other varieties of this cushion type have been developed, all of which have the desirable trait of making a colorful showing in late summer.

Species blood lines were brought into the group first with the introduction of the Bristol Hybrid Koreans in 1932 to be rapidly followed with the *arcticum* hybrid group. More recently *Chrysanthemum nipponicum* has contributed directly; a few other related species less directly. The infusion of all this new blood within the last 15 years has given us a far better type of garden chrysanthemum, for in addition to the added vigor characteristics of the hybrid, other material changes have been brought about—intensification of color, a much wider range, and a multitude of blends have appeared. Better too is the habit of growth. A rather pronounced trait of the typical Korean Hybrid is its habit of branching from the ground; hence a much more prolific plant when in bloom. Nor should we overlook the garden value of the plant in itself long before it blooms. A lusty growing chrysanthemum plant is a picture in itself.

The greater spread in the flowering season can perhaps be best illustrated by noting the change in the seeding habit. A few years back it was just about impossible here in New England to secure seed from outdoor plants even in the most favorable season. Among those early Korean Hybrids there were some from which seed could be taken in the garden, conditions being right. Now many kinds seed so freely in the normal season that it is not unusual to see hundreds of seedlings springing up in various gardens.

Somewhat of a nuisance this trait can be, but it at least indicates a great and desirable change in the flowering habit of the garden type of chrysanthemum.

This accumulation of added traits combined with greater hardiness has made it practical to grow them in zones that previously were considered out of the question. By and large, the chrysanthemum actually comes closer to being an indispensable garden subject than any other group one can think of because it continues the effective garden season for weeks and weeks after those early frosts have destroyed just about everything else. This, in fact, is the time when we see the chrysanthemum at its very best; it takes a frost or two to bring out the real snap and brilliance. We should bear in mind too that it was not too long ago when the hardy aster, not the chrysanthemum, was the dependable source of all garden color. With this improvement has come new methods of uses that should be better known.

The garden chrysanthemum providing, of course, the plants are young and well grown, can readily be dug up most any time of the growing season without the slightest trace of setback or injury. It is an established practice in many good gardens, public and private, to replace annual displays immediately after frost has destroyed them simply by moving in chrysanthemums in bud or bloom, the plants, of course, being grown in the service garden or elsewhere just for this purpose. This can be real helpful to the small gardener too; there are always gaps and prominent spots that need color during those fine autumn days. It is surprising how a few plants can transform a garden picture so completely.

Let us keep in mind too the fact that few flowers compare with the outdoor chrysanthemum for cut flower usage

alone. There is a long season of cutting from the better kinds and a remarkably wide range of color and blossom types to work into nice arrangements. Equally important, the chrysanthemum when cut keeps exceptionally well—three to four weeks can be counted on with good care. A dozen or more plants grown in any out of the way corner just for cutting would prove a mighty good investment figured on the present cost of flowers. It's a grand feeling to have surplus flowers for your friends at a season when they are far from plentiful, so don't overlook the possibilities of the chrysanthemum just as a cut flower.

EASY TO GROW

Suppose we first of all dispose of some of those traditional rules that still appear in print, insisting that chrysanthemums must be planted in sheltered spots on the south side of a wall or hedge or in a warm, protected corner; that they must be watered daily and the foliage sprayed often during hot weather. There was reason for these rules some years ago; today every one is wrong, absolutely wrong.

Grow your chrysanthemums away from dry foundations, hedge roots and stuffy corners. The protection is not needed for these hardier, early flowering kinds and these conditions breed blights and insect pests galore. That persistent overhead sprinkling provides exactly the conditions needed for the rapid spread of eel worm and other insects that apparently were not troublesome in years gone by.

Equally bad is the practice of planting chrysanthemums between quick growing annuals or perennials in the mixed border. Plant them in beds, not too wide, by themselves as you would roses, or in groups of three or more plants along the forward side of the

mixed border where they can be cultivated and watered as needed in group fashion. For cut flowers or as an extra supply for autumn transplanting, grow them in straight rows. Perhaps a row or two can be located so it will serve as a dividing line or hedge in the vegetable garden. Space the plants 20 to 24 inches apart in the row with the rows a full 4 feet apart. In beds or groups in the border, 18 to 20 inches apart will be about right for average soil conditions.

The soil should always be prepared thoroughly. Use manure freely, if available, with shredded cattle or sheep manure as a second choice. Add bone-meal at the rate of a handful per plant, then a 2-inch layer of peat or leaf mold. Dig this in to a depth of 15 inches at least, mixing it thoroughly at the same time. This deep soil preparation is important for it adds up to a well anchored root system, the kind that resists hot, dry spells, also severe winter conditions.

Proper watering is just as important. As previously mentioned, frequent light applications are harmful. The penetration is insufficient; consequently the roots are brought to the surface and easily injured through heat and surface drying. When water is needed, water so that the moisture penetration goes down below the roots, certainly not less than 12 inches in depth, more is better. The easiest way would be to let the hose run slowly over a short piece of board or through a burlap bag tied over the hose. This to prevent soil erosion or washing, the hose to be moved from time to time as needed. This may appear somewhat of a job but keep in mind that it does not have to be done often. After watering, cultivate the soil lightly so that an inch of well pulverized dust mulch will result, then watch the plants respond. The surface will of course look fear-



Pink Radiance

fully dry after a day or two but don't let that tempt you to water again. Just cultivate lightly once a week. When the plants show definite signs of wilting in the late afternoon it will again be time to water. Here in the North not more than three such waterings are needed in a normal season.

Throughout the South and West or wherever summers are abnormally hot and dry the matter of watering is all important. To refer to particular instances, Billings, Montana and Rome, Georgia, could not be considered good chrysanthemum country. In Montana, Mr. J. W. Currie takes care of this situation nicely by countersinking his beds three or four inches. Every two weeks throughout the summer the beds are flooded by letting the hose run slowly, no water at any time touching the foliage of the plants, the soil lightly mulched at all times. In Rome, a 6-inch board edging was used around the beds, the soil saturated about once a week. In spite of cultivation this treatment naturally brought the roots to the surface by late summer, then a 2-inch mulch of rotted barnyard manure and peat was added, which of course would be helpful in bringing the plants through winter safely.

The matter of pinching puzzles the beginner and it's little wonder. Pinching actually means stopping the growth by pruning off an inch or two from the top, thus inducing side or lateral branches, consequently a more bushy, compact plant. To pinch or not to pinch is the problem. Cushion varieties, naturally low-growing and branching, require no pinching at all. This applies to some of the pompons as well as the larger kinds. The majority of varieties, however, tend to run up two or three rather fast growing shoots in late spring. That kind requires pinching. It is good practice to pinch first in early May when the

shoots are about 9 inches high. Just nip off about two inches from the tips. A month or so later all straggly shoots can again be pinched and, if necessary, a few weeks later again. No pinching should be done after the end of July. By that time the plants should be very well branched, lusty and healthy, already a garden ornament.

With good cultural attention chrysanthemums are fairly free of insect pests. Aphis of course will appear on the tender shoot tips at intervals through the season. This is easily remedied with Black Leaf 40 or Rotenone spray. Foliage blights can usually be prevented by dusting the plants with sulphur occasionally through the growing season. Fermate, a new fungicide which will probably be available soon, is remarkably effective. It's a good idea whenever you are spraying roses or other items to give the chrysanthemum plants a shot whether they need it or not. Prevention is always easiest.

Division of old plants again is extremely important. Most of the trouble that I have seen in various gardens could be traced directly to the fact that plants were not divided as they should be, consequently roots were sprawling and shallow. Again there is no fast rule that can be applied. The cushion or azalea-flowering type plants are all better in their second year, therefore should not be divided too often. This would apply to some of the pompons and in fact to any moderate growing sort, but those rugged growing kinds that sucker so freely all around the plant in spring should then be taken up and divided. A strong division is far better than an old plant. It is good practice too to plant these divisions out in an area that has not been devoted to chrysanthemums before if this is possible. In any case prepare the soil as advised above.

Winter protection is a problem, par-



New Korean-Nipponicum Hybrid



Fireglow

ticularly in the North. Again, in sections where the winter is comparatively mild, which indicates that winterkilling is not simply a matter of severe freezing. Soft winters with frequent thaws are the tough ones. For that reason it is never safe to say that a chrysanthemum is hardy under all conditions. Few plants are for that matter. Generally, a light winter covering of any material that will not pack is safe. Flat evergreen branches covering the ground first with a top dressing of salt hay or oat straw is good; leaves as a second choice. Where winterkilling is a chronic occurrence, however, it is safer to take up a certain number of plants each season, heel them in a cold frame, which should be covered with shaded glass or board shutters, anything to keep snow and rain out. A light mulch here again is advised. Another method worth trying out in an experimental way would be to dig a few plants with a reasonable amount of soil, nest them on top of the ground in some sheltered corner where drainage is good, pack leaves between the balls of soil with an inch or two of over-all cover. This has worked surprisingly well.

There is always a temptation to uncover too early. It's a good idea to do this gradually, loosening up the cover, removing some from time to time so there is a little mulch around the crown of the plants in late spring. Those late April freezes often kill plants that have overwintered perfectly.

A FEW RELIBLE VARIETIES

So many really fine varieties are available now that a fine selection can be chosen from any good chrysanthemum catalog. In the average garden I think a balanced selection would be in order, some to flower from August on but the majority could well be kinds that normally come into flower in late September or early October. The early-flowering kinds will be more or less exhausted by this time and there are still weeks of good chrysanthemum weather ahead. Here are a few varieties to consider: Early-flowering, Algonquin, yellow; Azaleamum, also listed as Amelia or Pink Cushion, is a good pink; Dean Kay, another good pink. In the bronzes, Apricot Glow and King Cushion; Fireglow, oriental red. No real good white cushion available yet, Queen Cushion is still about the best. The large double-flowering kinds are general favorites: Mrs. Pierre S. duPont, III, bronze; Red Velvet, crimson red; Avalanche, pure white; Magnolia, creamy pink and soft yellow; Pink Radiance, pink; Lavender Lady, lavender; Burgundy, wine red; King Midas, yellow. Fine varieties every one of these and better ones are coming. Never before has the breeder had such a wide range of material with which to work. There is a splendid future for the garden chrysanthemum.

Developing New Clones of Chrysanthemums

E. J. KRAUS

There is no flower other than the garden chrysanthemum which blends quite so harmoniously with the changing coloration of foliage, ripening fruits, and the haze of autumn. Each year sees new forms and colors added to the list of desirable varieties. Through their use the glory of the garden can be extended by a full month or even six weeks, often well beyond early frosts and into November.

There still remains, however, the need for types which bloom ahead of severe frosts but will continue in bloom over a long period of time; those which are sufficiently petal hardy so that the flowers and opening buds are not greatly injured or discolored by frosts or even light freezes. Particularly desirable are the early flowering varieties which will resist the low temperatures of northern winters and survive the freezes and thaws of late winter and early spring when the ground is bare of snow, mulch, or other cover.

It is well realized that this last point is controversial. There are many who have little or no interest in attempting to overwinter chrysanthemums in the open ground, but prefer to set out new young plants each spring. Much may be said for this point of view. Many varieties even though they pass through the winter in excellent condition will make much better showing in the autumn garden if divided and replanted in the spring. There are also a few varieties which produce quantities of germinable seeds. Usually such seedlings are of inferior quality but grow with such vigor that unless care is used to eliminate them, they soon crowd out the more desirable stocks, or form an undesirable mixture with them. Still

there are many gardeners who would like to possess winter hardy varieties which could remain in place for several years, thus saving the time and energy required for transplanting, and which would possess such other desirable features as attach to any hardy, herbaceous perennial.

Climatic conditions of much of the north central midwest is not particularly favorable to the overwintering of herbaceous perennials unless they are possessed of more than usual hardiness. Overwintering is generally much more successful in those areas where a blanket of snow may be expected by the end of November or shortly thereafter, provided this snow covering remains more or less continuously until the advent of early spring. Despite somewhat higher winter temperatures somewhat farther south, winter injury may be very great. This is particularly true if alternations of temperature from 20 below zero to somewhat above freezing prevail, and such alternation is associated with a covering of ice over the soil or with no covering at all. As often as not loss of plants may be more severe in March than at any time during the winter. If there are a number of warm days at that time, activity of the plants may begin and then, if such a warm interval is abruptly followed by sub-zero temperatures with little or no snow fall, great injury ensues. Alternate freezing and thawing of the soil with consequent heaving of the plants breaks many of the roots, and kills stem and roots as well. Such injurious effects may be decreased by the use of mulches of straw, excelsior, or coarse litter, but dense covering of fine material which tends to pack solid is

often worse than no covering at all, because of its smothering effect. Greatest destruction of plants occurs on heavy wet soils and on very porous ones in which plants may be very slightly anchored.

All this is mentioned because the development of winter hardy varieties of any herbaceous plant involves very many complexities. It is less difficult to select one resistant to severe cold than to conditions of alternate freezing and thawing. The most trying problem of all is to secure those which do not become sensitized or tenderized during the last days of winter and early spring, by starting into growth during a period of warm weather which is followed by an extremely cold one. My own experience during the past ten years has been that a clone of chrysanthemums having numerous rhizomes which spread out from the main stem two or more inches below the surface of the soil and these tend to produce during the autumn a sufficient root system to keep them firmly anchored, is more likely to prove winter hardy than those which produce few. It is particularly advantageous also if the tips of these rhizomes do not come above the surface of the soil, and above all that they do not start active growth during a brief warm spell in late winter. Even the possession of these characteristics does not absolutely insure winter hardiness. The record of the experiences of those who have been working for more than a century on the problem of winter hardiness in various plants still leave doubt as to what characteristics do insure winter hardiness. My own experience shows clearly that seasonal conditions vary so widely between different localities or even within any single locality that the hardiness of a given clone can be determined only after a number of years of testing in

various regions and under several methods of culture.

The same principles hold true in selecting for bud and petal hardiness. Seasonal conditions prevailing during the growing period, especially those just immediately preceding final but swelling and flowering, exert a profound influence on the degree of frost or freezing injury at any given temperature. And, of course, as is well known, the conditions immediately following a frost or freeze are very important. Usually there is far less injury if the forenoon following a night of frost is cool or cloudy or rainy. Alas, all too frequently, the sun bursts out bright and warm and by noon the garden may become a sorry sight indeed. Unfortunately too, for him who is endeavoring to select for hardiness, no two autumns are quite the same—a severe freeze may come by mid-September or not before the end of October. But he need not feel too worried over this; sooner or later out of a series of years will come a test autumn with an early, genuine freeze. Then is the time for a stout heart and resolute purpose. Out must go all the promising selections and accumulations through perhaps four or five years, and only those which have withstood the test be retained. Or perhaps one should say those which have come nearest to the goal sought, for perfection seems always to lie ahead, and never quite attained. My own work, or rather, I should say pleasure, has now extended through ten years, and during this time I have grown many thousands of seedlings, one year 14 acres of them, though under present circumstances very few things are grown. From among all the hundreds of original field selections which have been made, all but 125 have been already discarded. A few have sufficient merit for introduction and trial, to determine whether under

the wide range of conditions a clone must be grown they may truly establish a place for themselves.

To prove truly worthy for everyman's garden is an enormous demand indeed. As to their time of blooming, *Chrysanthemums* are highly sensitive to photoperiod, differences in day length between north and south. They are even more responsive to temperature, most of them coming into bloom earlier and more quickly in cool weather than in warm. Blooming is greatly accelerated by cool nights. Some clones are far less adapted to withstand ill effects of rainy or foggy weather than are others. During prolonged periods of warm rainy weather leaves may blacken and drop, a characteristic which may be shown one year and not another. The tone and intensity of color is deeper in cooler weather. In the case of varieties which are not completely double, the relative size of the yellow open center varies with growing conditions. An enumeration of various characters and their relation to environmental and cultural conditions would make a long list. The perfect variety is still to be attained. And then, too, don't forget the things called personal preference and popularity. What one individual most admires may be distasteful to another.

The greatest need which will aid in hastening progress is a larger group of patient individuals who will help in the growing and selection of additional good varieties. It is doubtful indeed if any individual working at one place could possibly select a number of varieties that would prove superlative for all other areas. The day should be hastened and welcomed when there will be a number of individuals working under particular environments for which varieties may be developed and selected. Among these workers let there be a free interchange of materials

and constructive criticism. Adulation and condemnation come in adequate abundance without solicitation. Neither extreme is particularly helpful. It is with the hope that others may become interested that I set down some of my experiences through the past number of years in which I have been trying for hardy clones.

SOURCE OF PARENT STOCKS

One of the varieties selected because of its winter hardiness was a common form known to grow and bloom year after year in dooryards, old gardens in neglected corners—exposed or partially shaded, and more or less overgrown by weeds or grass. The bushes are tall and scraggling, but in October give a fair wealth of small, crowded, magenta flowers, often still in bloom after the early snows have partially covered them. The memory of this variety as it grew year after year in my grandfather's garden more than 50 years ago was an impelling factor in my decision to use it as a possible parent. In the same category is another somewhat similar variety. It is equally hardy, is not so tall, and has nearly double white flowers which turn purple and brown soon after expanding. I have followed its annual performance here on the sandy soils of Chicago for many years. Whatever their undesirable qualities, both of these varieties possess the great merit of hardiness to cold, and compete favorably year after year with miscellaneous crowding vegetation.

Several years ago I secured several very small, dwarfish plants from one of the parks in Fort Wayne, Indiana. These were said to have come from seed from Japan, and although the plants were not winter hardy and the flowers small and of little value, the plants bloomed in mid-June. These particular plants have long since died,

but they have contributed the character of early bloom which persists in some of their now distant offspring.

Through the U. S. Department of Agriculture several plants of hardy, early flowering varieties, from among the hundreds of seedlings grown and tested by F. L. Mulford, were secured. Each plant was different in form and color. They were of the same general hereditary stock as the dozen or more varieties since named and introduced by the Department of Agriculture, but none of the latter was among them. Of those secured, one proved entirely sterile in crossing, but two others produced seeds abundantly when inter-pollinated or when crossed with those from other sources. On several occasions I have used the yellow variety, Algonquin, both as a seed and pollen parent. It is a relatively early and profuse bloomer, entirely winter hardy here at Chicago, and a vigorous grower. Similarly, Geronimo (bronze) has also been used sparingly because of its early blooming habit, and in some of the first crosses Seminole (white) was used because it too is relatively early and profuse in blooming. Both tend to lose their foliage rather early here at Chicago and all have soft petals as they age the flowers assume a tassel-like form which results in a somewhat wilted appearance. Despite this they are very valuable to any breeding program and have definite garden value because they are early and winter hardy.

Because it is a rich deep red, the Korean variety, Mars, was used one year in some of the crosses. Many interesting forms and colors were secured and by self pollination of the best of these seedlings, some desirable individuals have been obtained. Most of the seedlings bloomed later than October 5, and so were discarded. A few early flowering plants of this line have

been continued, however, and by crossing these with some of the earliest flowering types from other lines of descent, hardy varieties of desirable plant form and good red color and style of flower are being secured. Red varieties are of several types. Many have the reverse of the petals light gray or white, which gives the floral mass a washed out appearance. Others are bright when they first open but soon fade to a red brown or dull copper red which is quite unattractive. Those of a third class are deep rich velvety red, somewhat lighter on the back of the petals. They often fade to a darker color, but they are definitely red, not a confused mixture courteously referred to as red. Such varieties have flowers unusually resistant to frost injury. Even though slightly injured, they still have great garden value long after most varieties have faded and gone.

Similarly, the variety Astrid was used several years ago as a parent. It was employed because it was reputed to be exceptionally winter hardy. Actually it has not proven to be so either at Chicago or Lake Geneva, Wisconsin. No plant of it persisted there through more than two winters. Also during some years it made very large bushy plants which produced no bloom whatsoever. Nearly all the seedlings resulting from this cross were single, although some were duplex and others semi-double. All were very late in blooming and in general the petals were subject to frost injury. Because of these characteristics, Astrid has not been used during the past six years as a parent, but from among the earlier crosses a few plants were saved. By self pollinating or crossing some of those of earliest bloom with the very earliest blooming plants from other lines, a few attractive seedlings were secured. The flowers range from sin-

gle to fully double, the plants are upright and compact. The flowers of the original crosses of Astrid were unusually beautiful in color and texture, having form and finish of highest excellence. A few of the derivatives from this parentage also show this finish, but this line is not now being continued because it produced a high percentage of single flowers, and especially because the plants tend to come into bloom late in the season. This would not be a serious drawback in regions regularly having a mild, prolonged autumn season, nor would it be under the conditions which prevailed in the vicinity of Chicago during 1940 or 1944, but ordinarily such a season cannot be expected.

Other varieties which have entered into our selection work are greenhouse forms of various types and colors, some of them not winter hardy, others partially so. The variety Glory of Seven Oaks is hardy most winters here in Chicago, and many of its offspring have a characteristic twiggy form, suitable for borders perhaps, but the plants tend to be very brittle; so much so that after they attain some size or are about to come into bloom, they split apart from their own weight, especially after a rain, or are easily broken during cultivation or even by brushing against them. The use of greenhouse varieties has resulted in a great range of flower type and plant form, but has also meant vigilance and vigorous adherence to ideals in discarding everything which is not strictly hardy when tested in the open garden. No specific line of parentage from these early crosses is now being continued, but it was from them that a complete color range was first secured. Extensive use has been made of many of the varieties selected and introduced by Mr. Alex Cumming. Attempts are made to secure various promising new introductions as they

appear, test them for at least a year in the open ground and leave them out over winter under natural conditions. If the variety survives and offers some characteristic not already inherent in clones previously selected, it may be used in future crosses. Occasionally even though a clone does not survive the winter, it may be used if it has some outstanding quality. The list used is far too long to mention them all individually, but the very interesting color and sheen of Granny Scoville, and the color, plant habit and comparative hardness of Autumn Lights deserve special mention. I have not used Amelia despite its early blooming habit because longer individual flower stems than it possesses were desired, and because its bushy form occurs many times among my seedlings, in any event. For somewhat similar reasons single forms have not been generally used, some appear in nearly every line each year, although the number now occurring is relatively few. As already stated, any new clone offering possibilities of improvement of our present lines will be tried, but for the most part, crosses are now confined to selections whose parentage is known, often through several generations.

SELECTING AND TESTING THE NEW CLONES

Each year from ten to thirty thousand seedlings are grown in the gardens and field at Lake Geneva, Wisconsin. During the past ten years more than 300,000 individual seedlings have been grown. They are as sturdy as the most vigorous Zinnias, and on any soil suited to the growth of the latter chrysanthemum seedlings will thrive provided they have full exposure to sunlight. During the summer and fall these seedling plants are inspected from time to time for desirable individuals of distinctive merit. In early autumn

those selected are lifted from the garden and brought into the greenhouse and saved along with others for seed production. After the seed has matured, the plants are set aside until spring. Cuttings are then made, and later the plants are set out in the open garden.

The following procedure is used in making the crosses. When sufficiently mature, some of the heads of flowers on each plant are pollinated each day for a series of days, with their own pollen. Others are pollinated with pollen from any other chosen variety, using caution, in the case of the precisely controlled crosses, that no variety of pollen other than that desired is introduced by bees, flies, or other means. It is necessary to pollinate the flower heads on several successive days because each consists of many flowers closely fitted into a compact group and these reach maturity at different times, generally those near the outer portions of the head maturing first. If a variety happens to be sterile; that is, it will not form seeds when pollinated with its own pollen, it is not necessary to remove the stamens from the flowers before the pollen is shed. But to be absolutely certain of the percentage of any given seed, it is necessary to remove the stamens from the flower to be pollinated before any pollen is shed, with a very fine pair of tweezers or scissors. Later, after the stigmas of the pistils have matured, the selected pollen is applied to them, and, in a fair percentage of cases, seeds are produced. This method, although painstaking and somewhat lengthy, is absolutely essential to secure crosses of definitely known parentage. Unless plenty of skilled help is available, the number of controlled crosses which can be made in this way is very limited. But if one is less demanding in precision it is entirely feasible simply to interpollinate the flowers of any given plant or of

different plants merely by brushing lightly across the entire flower head with a camel's hair brush, making certain that pollen is present and that it is brought to the stigmatic surfaces of the pistils. In this way large quantities of seed may be secured from some clones with little effort. Flower heads which are wholly double produce few seeds even under most favorable environments. Although time and patience are required in crossing the flowers, the satisfaction derived from seeing the almost endless variety of forms and colors which are obtainable is wholly adequate recompense.

After the seed has ripened, it is our practice to cut off the old tops of the plants, and then move them to the coolest part of the greenhouse in order to retard too rapid growth of the new shoots. By about late January or mid-February there will be a considerable number of fresh green shoots started, the number and vigor varying with individual seedling types. These are used for making cuttings which are then rooted in sand. In our own tests twenty-five rooted cuttings of each new selection are planted in rows in the gardens of Lake Geneva, Wisconsin, and at Chicago, Illinois, and their performance in habit of growth and flower production is critically recorded. Those which do not come up to standard, or do not offer something of value in earliness of flower which would give them potential value as parents, are dug up in the autumn and destroyed. Often more than half of the selections may be discarded after the first summer. The others are left in the open garden with no protection whatsoever other than the few leaves which may drift in from the neighboring trees or the snow which may fall and be held by the old tops of the plants, which are not cut off until the following spring. It has been especially gratifying that the U. S.

Horticultural Station at Cheyenne, Wyoming, and more recently, several interested nurserymen and many amateurs have undertaken comprehensive trials of some of the selected varieties.

The soil at Lake Geneva is a medium heavy clay loam, well drained in one of the gardens, not so well in the others. At Chicago the soil is a light, porous sand which requires the addition of fertilizers and constant attention to watering during the summer months. This point is mentioned because the growth and relative hardiness of chrysanthemums is in part conditioned by the soil upon which they are grown. In our experience, many varieties are more subject to winter killing on the light sandy soils in the region of Chicago than they are on the heavier clay loams. This is especially true when the fall of snow is light and there is continued freezing and thawing of the soil. It is for this reason that we test our clones for winter hardiness at Chicago as well as at Lake Geneva. To determine susceptibility to early frosts and light freezes the latter location is preferable because on the campus of the University of Chicago severely damaging frosts ordinarily come relatively late. The autumn of 1939 was an excellent and welcome test year at Lake Geneva, for there was a killing frost about mid-September and during the third week of the same month the temperature fell to 20° and did not rise above 27° for three days. This provided the necessary test of petal hardiness. Fully 300 clones from among the number which had been accumulated through previous years were discarded because of frost damage. A fairly large number could be retained. Again, the summer of 1942 was very wet, and the autumn also provided a test for bud hardiness. Many selections were discarded because of the blackening of the foliage during con-

tinued wet weather, and other because they did not prove hardy.

Well, we had much more room in the garden for testing those which remained after those two helpful years. In selecting for early blooming and hardiness, nothing is gained by being tender hearted or weak kneed in vigorously culling out and discarding the unfit. From all the thousands of seedlings grown during the past ten years, 1,169 original selections have been made, and I now count up from my notebooks that, exclusive of 65 new seedlings selected in the autumn of 1944, 130 of these remain to go once more through the testing garden next year. All the rest have been discarded for one reason or another. Of those remaining perhaps 50 or 60 may be worthy of eventual introduction as named clones. Some are retained because they offer something desirable as possible parent stocks. Others are too good to throw away but not good enough to keep, so they continue to occupy space which should not belong to them. Perhaps judgment has been too critical, perhaps not sufficiently so. Individuals to whom seed has been sent often report an astonishingly large percentage of fine things worth keeping. I, too, used to think some years ago I obtained many good things but time changes viewpoints. Perhaps too, others have had experience similar to my own in going over the fields, making the final selections with a resolve to make no more. Then come friends, amateurs, professionals and the list of the saved could increase ten fold, but resistance to add more remains firm. More truthfully, one should say rather firmly, because nearly always a few selections are added with the excuse, "Oh well, these things can be discarded if they really are not worthy." As a matter of fact, more often than not those selected after some hesitation do

not prove worthy. On the other hand, I have more than once discarded a numbered selection and been happy later to pick up a plant of it from some acquaintance who had more faith and persistence in trying it out than had I.

Individual preferences vary. That is why growing chrysanthemums from seed is a very interesting adventure. But one should not anticipate that first-year seedlings will necessarily appear the same when grown the second and succeeding years in the garden. No one can predict with absolute certainty the degree of winter hardiness of any seedlings until it has been tested under a range of climatic conditions and soil types. And, too, the shape, shades, and tints of flowers, the height and general form of plant vary appreciably with the environmental conditions and seasonal variations under which it is grown. If permanence in the border or garden is expected, all plants should have undergone tests for at least two or three years for winter hardiness, and have demonstrated the form they are likely to continue to show. Five years would be more desirable. But it is doubtful if in general so long a period is likely to intervene between the time of selection of a clone and its ultimate introduction. There seems very little reason or cause for the note of alarm that there are too many varieties of hardy chrysanthemums now. Certainly there is a long list, but there are not too many *good* ones. There is as much room for a range of varieties of these charming flowers as for the dahlia, the gladiolus, the rose, the iris, or many another. To me there does not seem a real need for summer blooming clones to compete with summer annuals. The chrysanthemum is at its best with the changing and heightening colors of autumn as the summer garden is fading. Clones which are sufficiently early to come into flower before severe frosts are

very desirable, but if they have a short blooming period and are wilted and sere just as the glory of all is coming to its height, much is lost. There are early flowering varieties which continue in bloom for weeks on the new shoots produced as the season advances. These are indeed choice and more of them are needed. And there is room for more of the later blooming types which are sufficiently bud hardy to withstand frosts and even freezes. This is particularly true for the darker flowered varieties whose colors blend with sumac, hard maple, the scarlet and mahogany of oaks, and the rich golds of other trees and shrubs. Among the most satisfying of all in northern latitudes are the few which even though lightly touched by frost still possess great garden value even at the end of October or during early November. Never shall I forget the thrill this past Autumn of gazing across the tree encircled test garden at Lake Geneva where the selections of many hybridizers are grown each year. Here, after several nights of frost and freezing weather, bathed in the glow of a November sun, more than twenty-five varieties gave back a full symphony of color ranging from saffron to darkest ruby; a deep, full "Song of Autumn" in the cathedral of this quiet woodland.

These are the somewhat prosaic details of the evolution of our work to date. But they tell little of our many thrills and pleasures and not a few disappointments. These must be individually experienced. We now have varieties ranging in blooming season from mid-July into November. The first period is almost too early and the latter sometimes too late. North of Chicago, in average years, frosts and light freezes occur before then. If the variety is strictly petal hardy, however, as some of the newer ones are, they often provide a good show of color up

to, and into, November, and though the flowers may no longer be of exhibition quality, the mass garden effects repay any effort. One note of warning should be given the lover of flowers—once he begins with chrysanthemums, he will find no ordinary amount of courage sufficient to enable him to loose himself from their enchantment.

My own pleasure has been deepened by the enthusiastic interest and help of three of my friends: Mrs. Barbara Small, whose infinite and painstaking care resulted in our first controlled crosses; Mr. M. J. Costello, who has charge of the greenhouses at the University of Chicago; and Mr. William P. Longland, Superintendent at Wychwood, Lake Geneva, Wisconsin. To many others, some of whom I know only through correspondence and their

reports on plants and seeds which have been sent them, I am deeply grateful for criticism, counsel, and encouragement. A few clones have been named and introduced as the Chicago Strain. Others judged worthy may be released as time goes on. I do not expect any clone either of my own choosing or that selected by anyone else to prove of equal value everywhere. Such paragons of perfection are products of wishful thinking, not realities. Since this is so, and because of the increasing interest in growing hardy chrysanthemums, let me express once more the hope that activity in selecting varieties adapted to specific needs and tastes will increase. The joyous thought of prolonging the season of color in autumn gardens is abundant recompense for whatever amount of patience and care may be required.



*Carib children in Surinam on their way to school to learn the ABC
of the white man.*

Vanishing Plant Lore

W. ANDREW ARCHER

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The white men who first discovered this continent took over only the more obvious of the plants used by the native Indians. Such things as corn, tobacco, quinine, pumpkins, potatoes, and tomatoes could not be ignored. Even the tomato was looked upon with suspicion for a long time before it came to be accepted as edible. The thousands of other plants employed by the Indians were considered to be unimportant;

medicinal plants in particular were dismissed, by and large, as mere superstition. Very certainly the Indian did nothing to dispel this conception, in fact ethnologists and botanists often experience extreme difficulty in eliciting valid information from medicine men about plants. This reluctance on the part of the medicine man is by no means always due to actual distrust of, or dislike for the "white man" but fre-



Market scene in Chichicastenango, Guatemala.

quently is merely a means of protecting "trade secrets," just as any drug company does with a patented remedy. The prestige of a medicine man depends upon his ability to dispel the "evil spirits" or illnesses of his tribe by means of secret concoctions. Often his income derives from his private prescriptions or formulas.

As generations have passed, comparatively few adequate studies of Indian plants have been attempted. True, many books and articles have been writ-

ten about the subject but in general the writers of these contributions have been satisfied merely with listing the Indian names of the plants together with the reputed uses. Very little was attempted experimentally for actual verification of the medicinal properties.

The preparation of pressed botanical specimens for permanent preservation has been desultory. The ethnologist usually manages to accumulate accurate data about plant lore but too often his specimens are poorly prepared or other-



Herb market in Concepción, Paraguay.

wise unsatisfactory. On the other hand, the professional botanist may prepare good specimens but usually ignores the economic data. As a result, our botanical institutions are scantily supplied with specimens suitable for the study of native economic plants.

A project, carried out several years ago by the United States Department of Agriculture, in collaboration with the University of Nevada, to investigate the medicinal plants of Indian tribes of the State, has led to conclu-

sive proofs that many of the plants do have the remedial values claimed by the Indians. In these studies great care was taken to authenticate the information obtained from the Indians, by repeated questioning of different individuals. Two of the investigators, Mr. and Mrs. Percy Train, traveled constantly to visit scattered settlements of different tribes, even going to distant points to locate elderly people who were particularly esteemed by tribal members for their great knowledge of

plant remedies. Mrs. Train, by learning two Indian dialects, and by using tact and understanding, obtained most of the records. These investigators made certain, also, that the information always related to a definite pressed specimen so that the botanical identity of the plant in question could be verified. Once a degree of accuracy could be assigned to a given remedy, quantities of the particular plant were collected to serve as analysis material.

The analysis material was sent to the University of Minnesota, where Dr. Raymond N. Bietter, of the School of Pharmacy, conducted the requisite experiments and tests.

These studies, made only a few years ago, very likely could not be duplicated at the present time, because most of the Indians in Nevada, who cooperated in supplying information, had reached advanced ages and undoubtedly many of them have since died. In fact, one reason for the successful accumulation of information from these old people was due to their desire to preserve such records for the future of their tribes. Few, if any, of the younger Indians were acquainted with the tribal plant lore, or even considered it of importance.

The disappearance of tribal customs with the death of old people in Nevada, is by no means unique. The identical situation exists elsewhere. Already many tribes have been exterminated, while others are in the process of being broken up or absorbed. Furthermore, the conqueror imposes his education upon the aborigines by either formal schools or missionaries. As the Indian children trudge off to school to learn the ABCs of the dominating race, the parents of these children meanwhile continue the old ways of their ancestors. But the tribal mores cannot be imparted to the children because they are too occupied with the kinds of in-

struction, and eventually they grow up versed in the ways of the white man but with little knowledge of their own tribal lore.

An explorer seeking to learn about native uses of plants, soon discovers that the educated Indian, who can read and write, will be of little assistance. Such an Indian very likely will reply in perfect English, or Spanish, or Portuguese, or Dutch, according to the country, that, "we educated people do not believe in those old superstitions." On the contrary, the illiterate Indian, if properly approached or remunerated, will impart gladly what he knows.

It is already too late to seek plant lore where tribes have vanished or where old cultures have been displaced but prompt action would preserve much that is rapidly vanishing throughout this hemisphere. Native peoples, especially outside the United States, still utilize plants for a multitude of purposes. Unquestionably many of these plants, if properly preserved and analyzed would yield valuable products. The studies in Nevada produced an anti-oxidant of great commercial value in the preservation of fatty foods. In Brazil, Ricardo Fróes secured from an aged Indian a complete enumeration of the plant ingredients for the curare poison, which is playing an important role in medicine. The wax from a common plant in the tropics, the leaves of which are widely used by the natives as wrapping material for meat and other food, may become a possible competitor with the wax which at present is secured from the carnaúba palm. The root of an obscure plant from the Tapajós river in the Amazon basin may become an important rat killer, while a relative of the same plant may develop into an insecticide. Indians in Guatemala and the Amazon utilize certain plant products to produce a beautiful black enamel-like covering for gourd



Percy Train collecting samples for analysis of Indian medicinal plants in Nevada.

utensils. Even yet, the Ecuadorean and Chilean Indians employ plant dyes to produce brilliantly colored textiles. The examples could be multiplied endlessly. But without immediate and adequate measures most of these plant secrets will be lost irretrievably.

The awakened interest and combined efforts of amateur and professional botanists would do much to save this interesting and rapidly disappearing lore. Very little is required in the way of equipment, other than an ordinary plant press, a quantity of blotters, cardboard venilators, and old newspaper sheets. In all cases, the collector must prepare a good pressed specimen with flowers or fruits, sometimes both, to accompany the data so that the botanical name of the plant can be deter-

mined. The plant notes, to be reliable and complete, must give the name of the collector, the date, the place collected, as well as other information which is not obvious in the specimen itself. Additional information would indicate the local use of the plant, method of preparation, as well as the native or Indian name; and in the case of medicinal plants, the dosage is an important part of the record. Samples of plant products to accompany the data and the botanical specimen, are desirable but before contemplating any extensive activity in this line, especially for medicinal plants, it would be well to make previous arrangements with some agency or individual so that shipments would be received and given proper attention.

In foreign countries, where both the people and the language are new, the collector will have full opportunity to display tactfulness in dealing with the people and resourcefulness in learning the language. And the degree of his success will be measured in the number of plants collected and in the amount of information recorded.

Latin American markets, especially

in smaller towns, always prove to be fascinating hunting grounds for unusual food plants and strange herbs. Latin America, also, presents a rich field for studying the plant lore of Indian tribes which are still relatively untouched by the new civilization. An observant traveler with time to spare could turn up a veritable treasure trove of specimens and information.

FOUR GARDEN SCENES

FROM THE WORKS OF

MISS ROSE GREELY

WASHINGTON, D. C.

Although some of the photographs may belie the fact all of the four scenes given are city gardens, two relatively small in extent, the other two larger but so planned that some of the woodland belonging outside the property appears to belong to the garden itself.

The first, a Spring garden is conspicuous for the interplay of light and dark; with an overshadowed pool darkened still more by the use of broad-leaved evergreens, in sharp contrast to the light-filled middle and back ground, made brighter still in the Spring, by the thick whiteness of the dogwood. (See page 116.)

The second, a paved terrace in which Nature yields in trimmed evergreens or in uncertain vining to the patterns of brick and stucco. Transient notes of color come from potted plants changed with the seasons. Here plant form is frankly managed, either to conform with architectural form and pattern, or to give a maximum of contrast (See page 117.)

Here the broken patterns of the plant materials strengthened by the vertical motif of tree trunks is again accentuated by the vigorous contrast between the flat tone of the pool, the illuminated willow, all yellow green in tone and the dark masses from which the tree trunks rise. (See page 118.)

The ultimate in contrast, a sharply geometrical plan clearly set out in color contrasts and shadow, with a completely informal use of plant material. This is the type of planting that requires the most subtle management to maintain in balance, with Nature free but never wanton. (See page 119.)

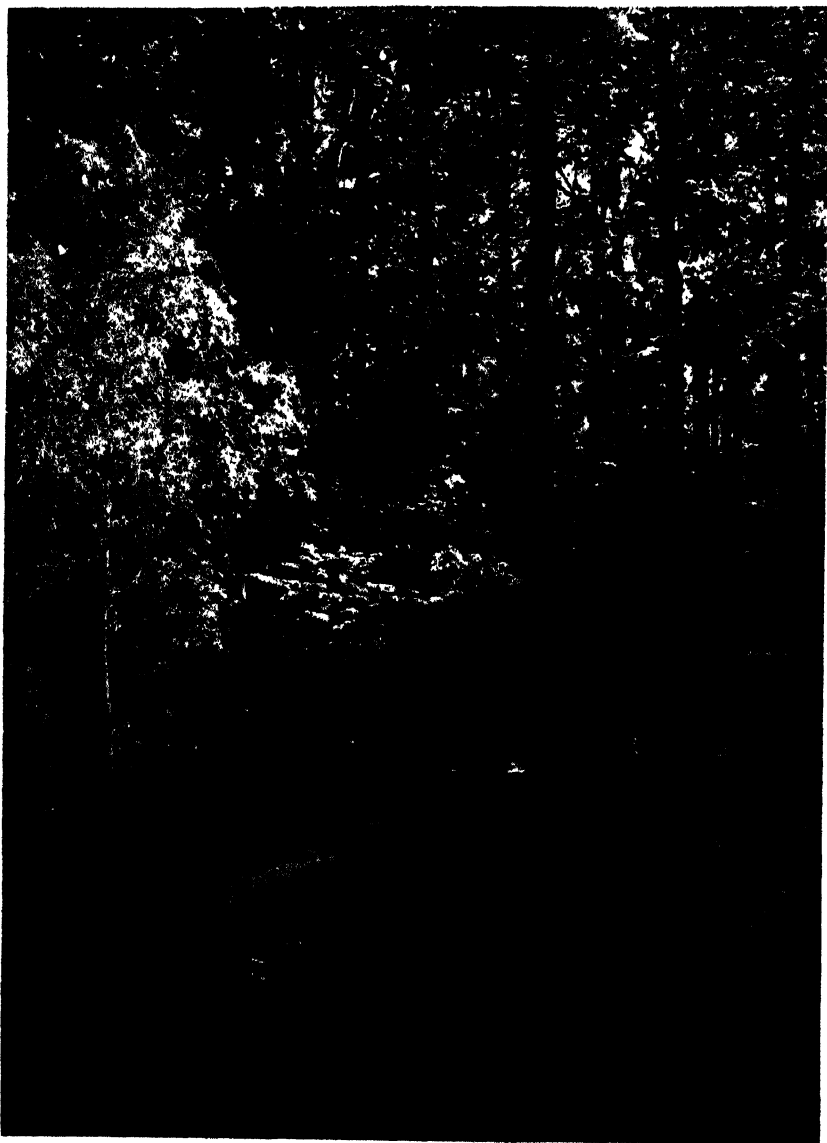


Dorothy Jarvis

"Brighter still in Spring . . ."



"Here plant form is frankly managed



Frances Benjamin Johnson

"The vertical motif of tree trunks is accentuated . . ."



Silvia Saunders

"The ultimate in contrast . . ."

Bamboo - A Must for the South

E. A. McILHENNY

To say we in America are hundreds, yes, thousands of years behind the Chinese in some forms of agriculture may seem to those agriculturists who do not know bamboo ridiculous, but it is a fact nevertheless.

In China, where recorded man has lived for a much longer time than in any other part of the earth, the natural forests, as we in the United States know forests, have been exterminated for hundreds of years, and in many sections bamboo is the only available timber. It is in China that the growing and use of bamboo has reached its greatest development, and there it is used for every phase of human existence, from food to clothing and building material.

On every farm in the south where there is rich land, and where the temperature does not fall below 15 degrees Fahrenheit, a bamboo forest—even if covering only one-half an acre—would be a good investment, and there are now 4,000,000 such farms, and the number is increasing continually. The life of such a planting is very long and its annual yield of marketable canes, if harvested properly, is continuous. Once established, bamboo goes on producing year after year, with no expense for cultivation or upkeep, and will supply almost all the timber needs on a farm, besides plenty of nourishing food.

Grasses are probably the most universal, valuable and useful of all the plants of the world. Those such as wheat, rice and the many other grasses whose seed are used for human and stock food are widely cultivated, while other grasses provide the bulk of the nourishment for our great herds of livestock, and still others have wide uses

in industry. Bamboo possesses all the essentials that mark a grass; therefore, bamboo is a tree-grass, the greatest in size, with a wider range of uses than all other grasses put together. Bamboo, a plant which has only now begun to find a place in the agriculture of the United States, is the most versatile of all plants.

To illustrate how fully bamboo can fulfill the needs of man, one must realize, houses may be built entirely of bamboo, without nails. The larger sections are strong enough for framing timbers and rafter, if mortised and held together by twisted bamboo thongs. The split canes in broad sheets are excellent boards for sidings, floors and partitions. Doors are made from the same material, and fastened in place with twisted bamboo thongs, and the sloping roof covered with interwoven bamboo twigs forms a covering entirely impervious to the heaviest rain. The larger sections of bamboo stalks are easily fitted to form water conduits and drain pipes. Sections of the larger trees, when split, are the finest of firewood, and every piece of furniture needed in a home can be made from bamboo held together by bamboo thongs. No other wood can be put to such a variety of uses. I have seen lathsheds many acres in extent built entirely of split bamboo. Young bamboo shoots are a delicious and nourishing food. Additional uses for bamboo as they are now used in Louisiana are:

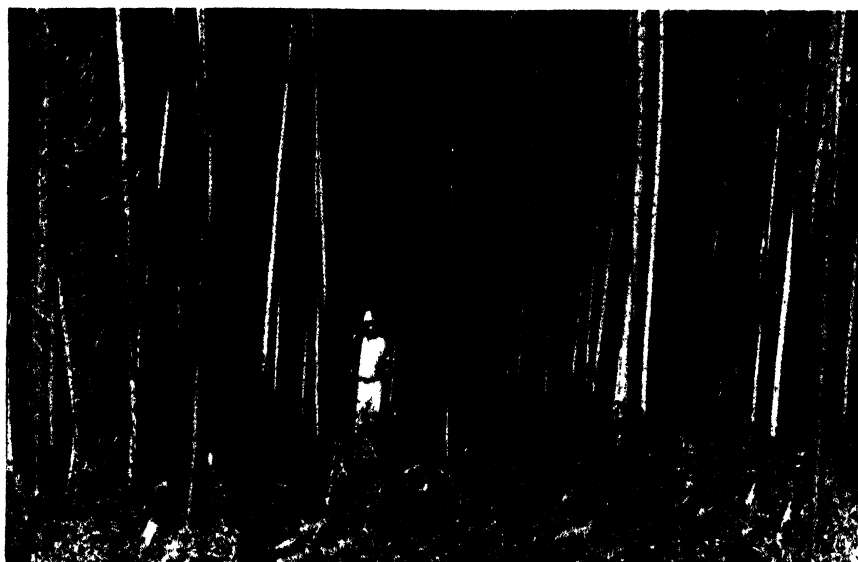
Poles for propelling boats,

Woven articles of many kinds, including baskets, trays, etc.,

Furniture of almost every type,

Yard rakes made entirely of bamboo,

Handles for tools,



A forest of timber bamboo now growing at Avery Island, La.

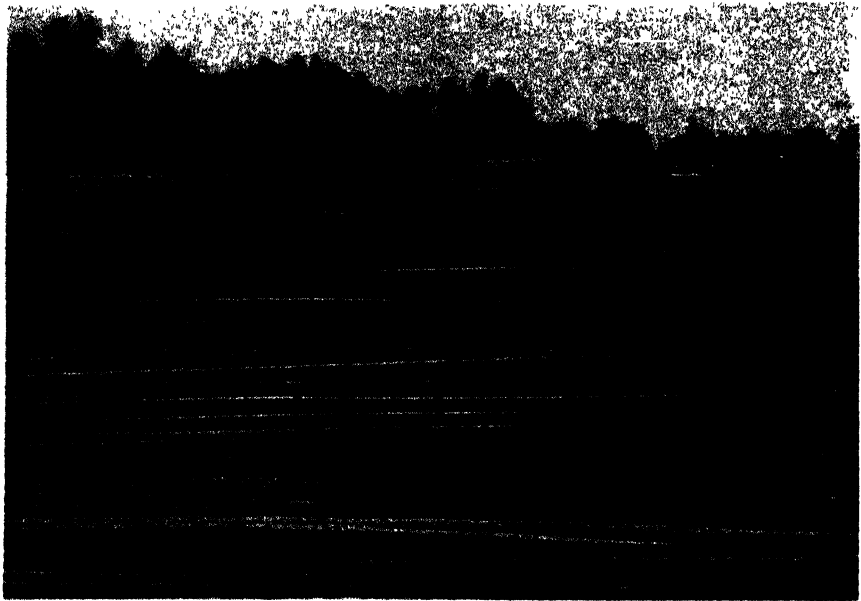
Buckets,
Poles for drying clothes,
Fencing and railings,
Various toys and ornaments,
Water Conduits and drain-pipes,
Walking Stocks,
Telephone and Radio Areolon Poles,
Rope,
Pipe Stems,
Flower Stakes,
Window Shades,
Musical instruments,
Mats,

and a host of ornamental objects. Bamboo is also an excellent reinforcing for concrete. Under actual shearing tests, the strength of dry timber bamboo has proven to be between 1,800 and 2,700 pounds to the square inch. The tested crushing strength of bamboo used for water pipes or drainage tiles has been determined to be approximately 766 pounds per lineal foot for the $3\frac{1}{2}$ " diameter canes. Two-inch diameter canes will withstand a pressure of 374

pounds to the lineal foot. Clay tile measuring $3\frac{1}{2}$ " in diameter has a crushing strength of only 276 pounds.

In fact, bamboo is almost unlimited in its use, and Asiatic bamboos growing at Avery Island, Louisiana, have been shipped to all parts of the United States to be used for various purposes. The shoots of some varieties, such as *Phyllostachys edulis* and *Phyllostachys Henryi*, are used for food, and are much relished not only by Orientals, but by Americans for this purpose.

Large numbers of the upper ends of the larger poles cut 12 ft. long are shipped to the Pacific Coast for use on the commercial Tuna fishing boats, while the lower three-fourths of the same poles find a ready market for various industries, and are shipped in car lots to northern markets. Great quantities of the smaller poles are used for ordinary fishing rods. The better quality large poles are used for making split-bamboo fishing rods. The canes of the



Bamboo poles cut for shipment, graded according to size.

smaller type bamboos are used for pipe stems, and are supplied pipe makers in the north for this purpose in 20,000 to 30,000 lots. Hundreds of thousands of the smaller canes are used for plant stakes, and an unlimited demand for the medium-sized canes is at hand locally for trappers' stakes, for making the set traps in marshes where muskrats and other fur-bearing animals are caught. The larger canes are used for various ornamental purposes: the making of flower vases, match-holders, and recently carloads of the largest canes were sent north to be split and laminated together for ski poles to be used by our troops for which purpose this wood is admirably adapted, as it is not only light and very strong, but will not splinter if broken.

In order to keep a bamboo planting in full health and the production of full-sized canes, it is imperative that

not more than one-third or one-half of the mature three year old and older canes are cut in any one year. If cutting goes beyond this point, the growing balance will be upset, and the next year's crop of canes will be greatly reduced in number and size. One-half of the mature canes cut during one year is the safest manner for maintaining a commercial bamboo forest.

In order to test yield of mature bamboo plantings in the Gulf Coast area, the following cuttings were made at the Avery Island bamboo forests, where more than eighty acres are devoted to plantings of 64 varieties of bamboo.

In February, 1932, a test cutting of actually measured areas of various bamboos was made in order to determine the number of canes and gross weight per acre.

First, a cutting of one acre of fourteen year old *Phyllostachys bambu-*

soides yielded 22,491 canes, which, when put into bundles of 25 and weighed, gave a gross weight of 146 tons to the acres.

One acre of fourteen year old *Phyllostachys edulis* was cut and handled in the same manner, and yielded 15,876 canes, giving a gross weight of 143 tones.

Neither of these two plantings of bamboo had before been disturbed by cutting. Both are of the rhizomatus or forest type, and produce the largest canes of any species of Asiatic bamboo grown in the southern states.

At the same time, a mixed cutting of *Bambusa argentea* and *Bambusa* Alphonse Karri, measuring 2.44 acres, from a fourteen year old planting, in which no cutting had previously been done, yielded 111,941 canes, weighing, when huddled 25 to the bundle, 349 tons gross. These two varieties are bunch-growing types, whose canes grow so closely together that even a dog cannot pass between them. It is to be understood that these cuttings were clean cuttings—every bamboo was cut and weighed from the measured areas.

In July, 1944, the same area—2.44 acres—of *Bambusa argentea* and *Bambusa* Alphonse Karri that had been first cut in 1932 was cut, two-thirds of the canes being removed, and at this cutting there was a yield of 24,600 canes, with an average weight of 6 lbs. to the cane, or 147,000 lbs., which is equal to 73.8 tons. One-third of the stand of canes in this area was left in order to encourage more rapid growth, it having been found that when a complete cutting of any variety of bamboo is made, it requires a longer time for the growth to recover and become normal than if one-third or one-half of the standing canes are left.

In order to check the previous record of the growth of the *Phyllostachys* group, a cutting was made in February,



A fifty-foot gondola car loaded with large bamboo poles

1944, of one-half of the canes from one-half acre of the largest growing variety of *Phyllostachys*. Many of these bamboos measured 4-6 inches in diameter at the base. A total of twelve hundred canes were cut, some of them having a length of 62 ft., and a weight of 76 lbs., with a total weight of 79,254 pounds or 39.6 tons. A similar cutting in this same forest, started January 29, 1945, is now in progress, and about the same number of canes, giving about the same weight, will be harvested.

The nomenclature of bamboo is in a very backward state, for the best botanical authorities have not yet agreed as to the proper classification of many of the commoner varieties; for instance, the Arrow Bamboo of Eastern Asia is listed botanically as *Arundinaria japonica*, *Sasa japonica* and *Pseudosasa japonica*. All three of these names apply to the one plant.

That Bamboo has great possibilities for making of paper has been brought to my notice by the Industrial Engineering and Chemist firm, Arthur D. Little, Inc., of Cambridge, Mass., who wrote me under date of July 2, 1920, regarding the adaptability of bamboo for the making of paper:

"Numerous experiments have been conducted at our laboratories, and we find that bamboo of certain species is a very excellent substitute for the present wood from which pulp is made. Due to the extreme scarcity of wood pulp, bamboo will, in our opinion, largely replace this material in the future, especially in the manufacture of high-grade book and magazine paper."

Again, under date of October 18, 1920, Arthur D. Little, Inc., wrote me:

"We are still very much interested in the bamboo proposition to which we had previously referred. You, no doubt, are familiar with the prices which has existed for sometime past in the paper industry, and that the discovery of some new material for obtaining pulp is of vital importance. From various tests and experiments which have been conducted here in our mill, we have obtained an exceedingly high grade book paper, using bamboo pulp. A mill operating upon bamboo would, in our estimation, be highly successful."

Again, in July, 1927, there appears in the July Number, No. 7, of the Industrial Bulletin of Arthur D. Little, Inc., the following:

"In certain tropical countries, Salvador, for instance, the bamboo growing wild along the streams is relied upon to prevent erosion and maintain the river banks. As a measure of flood prevention along the lower reaches of Mississippi, it has recently been proposed to plant bamboo along the river banks behind the levees, with the expectation that the closely entangled roots will afford a large measure of re-

inforcement, while the bamboo stems will furnish a superior and constant supply of raw material for paper making.

"Without attempting to pass upon the merits of the proposition as a whole, it may be pointed out that bamboo is in fact an ideal material for the manufacture of the better grades of book paper. It is not adopted for newsprint. The yield of fiber is about forty percent of the dry stems. It bleaches readily and makes an exceedingly close, well-formed sheet, which is unusually light for bulk.

"Species are available that will flourish as far north as Vicksburg, and on experimental plantations in Louisiana there has been such density of growth as to yield, after the fifth year, thirty tons per acre of dry stems, and the same amount every second year thereafter for a long period before re-seeding. A given acreage in bamboo may therefore be expected to yield ten or fifteen times as much high grade paper stock as the same area growing pulp wood."

It is impossible for the people of the United States who have lived among the lush forests that covered North America, and which still cover much of our land, to look forward to the time, a few hundred years hence, when our land will be as bare of forests as China is today, and for that reason, and that reason alone, we cannot visualize the value of the rapid-growing and maturing bamboo capable of producing many times the tonnage of usable wood, many times as rapidly as anything else we know of that will grow from the ground, and with but little care after planting. When bamboo becomes established here, it will be as indispensable to our existence as it is now to the Chinese.

Every farm in the South should be supplied with a small forest of these



Bamboo poles cut and stacked for shipment. No pole in this lot measured less than 4" diameter at butt.

valuable plants, in the same manner as it is now supplied with a wood lot, but a suitable location must be chosen for such a planting. A rich, well-drained soil is desirable, and the two other most important factors governing the growth of bamboo are temperature and moisture.

The United States now imports (or did before the war in the Pacific), millions of dollars worth of bamboo yearly that should have been grown at home. Now is the time for our State Agricultural Departments to see that plantings of bamboo are made wherever they will thrive, so that the people of the southern states may be ready for the time which surely will come when our forests are no more, and we will be obliged to rely on the quick-growing

timber bamboo to supply the wood for all necessities, from the making of paper to the making of houses, and the furniture for the houses.

The artistic value of bamboo for ornamental planting cannot be too strongly urged. The clump varieties (that is, the varieties of *Bambusa*) are not only beautiful as individual clumps, but are as near perfect as anything can be to screen out unsightly buildings and places. These bamboos are among the hardiest of all, and there are varieties that grow compactly, in height from 8 ft. to 45 ft., and are, therefore, useful for either low or high screen plantings. In a treeless yard nothing will give more, quicker or more permanent shade than a few clumps of bamboo.

Do You Know Tomatoes?

A. F. YEAGER

University of New Hampshire

Most of us have a rather definite opinion as to what is meant when we speak of tomatoes. We think of them as being red, round in shape, weighing from $\frac{1}{4}$ to $\frac{1}{2}$ pound each with four to eight seed cavities inside, produced on long vines which continue to grow more or less until cut down by frost. It has finely divided leaves, a simple blossom cluster, a mild acid flavor. The principal differences in ordinary varieties is earliness. When we look through the variety list, those which would roughly correspond to the above description are numerous. There are some who say too numerous, that we have too many varieties which to the ordinary person are practically indistinguishable from each other.

Nevertheless, tomatoes do not need to fit the above description. In a real collection of tomato varieties and species we would find a great many variations from the above. In the matter of flesh, they may have red flesh, yellow, tangerine or greenish white. The color of the skin may be clear like glass, it may be orange or it may be purplish. The immature fruit may have dark green stripes, it may be light or dark green, it may have a dark green base to the fruit or be uniform in color. It may have a hairy surface or it may be smooth. The size of the fruit may vary from less than one-hundredth of a pound each up to two pounds each. The shape may be flat, round, oblong, pointed or pear shaped. The locules or seed cavities may vary all the way from two to twenty. The flesh may be thick or thin, firm or soft. The vines may be dwarf or standard. They may con-

tinue to grow indefinitely, that is, be indeterminate or they may finish their growth with a blossom cluster after a short distance, thus be an annual as contrasted to a perennial.

The leaves may be finely divided as in ordinary tomatoes or they may be practically entire, known as potato leaves. There is a wide range in leaf size. They may be wilted or upright, green or yellowish. The stems of the plant may be purple or green. The stems on the fruit may be double jointed or single jointed. The flower clusters may be simple as in ordinary varieties or very much branched, with or without leaves in them. The flavor may vary from acid to sweet. The odor may be that as we know it or the sickish sweet of some of the wild species. The vitamin content may vary from 10 millograms to 70 millograms of vitamin C per 100 grams.

If we examine all these possible characteristics and see what combinations there could be, for instance four different colors of flesh means four different varieties based on this one thing, then each of these may have either a clear skin or an orange skin which would double the number of varieties. For each of these types we might have a flat fruited variety, a round fruited variety, an oblong fruited variety, a pointed fruited variety or a pear shaped variety. In short, if we can picture the possible combinations, we will find that it would be possible to have more than a million varieties of tomatoes, which might be easily recognized by any gardener. In fact, these millions might be much more different from each oth-

er than the numerous varieties we already find in our seed catalogues. These are things which could exist and might be produced if they were wanted. Of course, under present circumstances not all of them nor anywhere near all of them will be found anywhere. Here are some of the common variants, however, which may be found in varieties that are now available. There are dwarf varieties as contrasted to standards. Most folks, however, do not take to these heavy leaved, short-stemmed dwarf varieties under ordinary circumstances. A more practical vine difference is the determinate character found in such varieties as Victor, Pennheart, Bounty and some others. This single difference changes a tomato from a perennial plant into an annual one and limits plant size. They are generally adapted to short seasons where a heavy crop must mature in a short time. There are a few potato leaf varieties. In many of the seed catalogues we may find pear fruited varieties of various colors. The Oxheart varieties and the Cherry forms are also listed. A newcomer in the color series is the orange fruited tomatoes, Golden Jubilee being a prominent representative of this group. Newcomers in the novelty class include such things as Tiny Tim, which may be matured in a four inch pot as a house plant, and Window Box, suited to the purpose indicated and which may be planted one foot apart in a row in the garden. The various fruit sizes are represented by Red Currant, which weighs only two or three grams. The Cherry tomatoes, which are next largest in size, the ordinary varieties and finally the large Ponderosa and Beefheart types. All these common variants, however, are not the most unusual things in the tomato family. New species introduced from South America by

plant explorers have brought with them characteristics which may or may not have value. *Lycopersicon hirsutum* has a greenish white fruit with a green stripe around its middle and a light covering of hair on the surface. The odor is not to be described, but certainly can be easily distinguished from ordinary tomatoes. The plants are large and flourishing. When crosses are made with this species, unusual flesh colors result. They may perhaps have little economic value, but it is certainly something different.

The species having some probable value is *Lycopersicon peruvianum*, resembling *hirsutum* to some extent, but lacking the hairs. This is a species which apparently has a higher vitamin C content than others. From some hybrids made with ordinary varieties, it now seems probable that this high vitamin content may be introduced into commercial sorts. A botanical variety under this species is *humifusum*, which creeps along on the ground out close to the surface for several feet in each direction. Again this may not have any great economic importance, but it certainly adds variety to the tomato family.

To the person who likes to delve into unusual vegetables, the tomato is offered as a good subject. If you grow some of the unusual forms in your garden, the average visitor would not identify them as tomatoes at all. Certain it is that all that is necessary to entirely change the looks of the tomato people grow in their garden is for them to want something different. Just tell a plant breeder what would be a better combination of characteristics in the whole list given at the beginning of this article, give him a little time and he can produce it for you.

Papaver Orientale

Twenty Years of Breeding

A. E. CURTIS

Those who think of Oriental poppies as the orange or brick-red poppies of grandmother's day are missing the glories of modern hybridizing that enchant all who see them. From the deepest reds to the brilliant scarlets and from a delicate flesh pink to the deepest cerise or salmon pink, you may have your choice of any tint you desire. There are also whites and near yellows. If you like softer colors, there is a whole series of pastel shades, ranging from whites tinged pink and lavender through old rose, lilac-rose, mulberry and wine to mahogany. These pastel shades, all of which have a little lavender or purple in their makeup, fade in the sun and should be grown in full light shade (no tree roots, please) or used as cut flowers. Some still do not realize that poppies are a fine cut flower, both for the home and flower shows. Newly opened blooms are cut in the morning and the stems are burned at once at the gas range (or other hot flame) until the end of the stem is turned to charcoal. Placed in water, they will keep from three to six days and will not wilt even when placed in full sun.

Our modern *Papaver orientale* is unquestionably a hybrid, probably produced by crossing several species, though I believe *P. bractactum* is the only one that has been absolutely identified. One research worker claims that the white Oriental came from a cross with an annual poppy, and a tendency to die after blooming is strong evidence of the claim.

There are three distinctly different root formations which, of course, have

been blended by hybridization into an infinite number of variations. There is the tap root type (probably the basic type) which grows down in one straight root and only branches when striking a hard substance. In a filled bed with three feet of top soil, a strong growing salmon pink (Lachs Konigen) produced three-foot roots in a single year. Poppy roots are as brittle as glass and break at the slightest bend, but there is one type of root in which the main root is almost woody and it produces a quantity of small roots that are quite flexible. This type of root originates in the wine colored poppies (Henry Cayeux is the best example). They are slow growing and extremely permanent and I believe this is the ideal type of root to breed into other poppies. It is just a guess but I think there was a shade-loving *Papaver* back of this parentage. These colors all fade in the sun and nature usually grows such colors in shade. They also like more moisture than the other types and do well in full light shade, though good drainage is still essential. The third root type I believe is a mutation I have only found it in two poppies—Wunderkind (the true stock) and Trilby, both of which are practically sterile. (You can find two or three large seeds occasionally in pods of Wunderkind especially if hand-pollinated.) The main root is very large and all side roots are constricted at their attachment, then immediately swell to large size and taper rapidly. The effect is that of a long carrot with several small ones attached. It is the poorest type of root we have. It is difficult to dig without

breaking of the side roots at their small attachments and it gives little stock for propagating, but they are two of our finest poppies and we cannot do without them. Part of the stock of Nancy in this country has this form of root and the growth and blooms are similar to Trilby and while I know it was imported directly from a reliable dealer, I still think it is really Trilby. I have left out of consideration Olympia and her children which multiply by underground runners. It is listed with the Orientals, but I wish a botanist with authority would settle the question. Unlike the other Orientals, it travels all over the garden and is liable to become a pest when purchased by the amateur as "a poppy anyone can grow." This poppy and several of its named seedlings are the only doubles in the Oriental poppy family.

Usually the Oriental poppy grows well without any special care, but in some gardens (and the gardener may be an expert) they refuse to grow and there seems to be no intermediate condition. It's either robust and full of vigor or spindling and dying. I have been trying for years to find the cause but so far without any definite results. I have seen them growing vigorously in heavy clay and some of the best plants I ever received were grown by a Hollander in black Michigan celery soil. They must have good drainage and I would say the ideal soil would be one with plenty of humus and some sand and the ideal location, a raised terrace. They should not be planted between tall perennials, as they need plenty of light and air in the spring. Chrysanthemums, zinnias or other annuals can be planted between the poppies to cover the bare places they leave when they become dormant in June or July, but beware of cutting the crowns if you cultivate. I prefer using a heavy mulch and pulling the few weeds that

come through. I believe that more poppies die by the hoe than from any other cause. Many poppies live for years and seem to be as permanent as peonies, but there is great variation in the length of life of the different named varieties and they also seem to vary in different localities. So any list of poppies found short- or long-lived as they have performed for me, might not only be misleading but unjust to the different varieties. The safest method is to divide your poppies when they are two or three years old so you will have some for replacements if you need them; but keep in mind the fact that an established plant may appear to be dead and yet come back after showing no surface signs of life for a year. In all of the garden books I have read, directions for propagating tell you to cut your poppy roots into inch and a half pieces. For the commercial grower with his facilities for propagation this is correct, but for the amateur gardener, it is just plain suicide. Take a poppy root six to ten inches long and at least as thick as a lead pencil. Plant it upright in good garden soil with the upper end about two inches below the surface (be sure it is the upper end) and it should give you a plant that will bloom the next spring. August and September are the best months and never replant until completely dormant in July. The best method of digging the plants is to dig a hole twelve to eighteen inches deep on one side of the plant. Take a steel rod (a stove poker is ideal) and carefully loosen the soil around the plant, exposing the roots; and remember the poppy roots are very brittle. If any of the roots break, save them, but be sure to keep the upper ends up as the new leaf buds form on that end. With care you can remove the plant almost intact. If it is an old plant, it probably has naturally divided into several crowns only slight-

ly connected which are easily cut apart. If you wish more plants, a slight upward pull on any of the large roots will detach them. If it is just one long root, you can cut it into lengths of six inches or more. If you do not care to disturb your plant, you can remove the soil from the side of the plant until you locate a good side root; then just remove this and replace the soil. Another method is to cut the plant off about six inches below the surface. Plant the crown and the cut off plant will usually come back from the roots left in the ground and bloom in the spring. In replanting, be sure to plant upright with the crowns three inches below the surface. Water them, in but do not bear down on the soil as the roots are brittle. Later see that soil has not settled leaving a water-pocket. After the leaves have obtained their fall growth and the mice have settled for the winter, cover the ground and under the leaves with a good thick mulch of straw, hay or other like material. Do not smother the leaves as they stay green all winter. All that is needed is to prevent heaving.

Of all the joys of flower growing, nothing equals the pleasure of growing planned hand-pollenized seedlings and rushing out each morning at blooming season hoping some of the characteristics you were trying for, will appear. For twenty years my wife and I have been hand-pollenizing flowers (mainly the Oriental poppy). During this time out of the thousands of seedlings produced, fourteen have been named and introduced. Of these fourteen, we have discarded seven and hope that they will not be resurrected to haunt us. Undoubtedly as we produce better ones, we may feel the same way about the others, but for the present we believe they are worthwhile contributions.

It is a waste of time and energy to try to grow Oriental poppies from seed

except for breeding purposes. The reversion to species (or throw-back) is very heavy and seedlings from the finest named varieties will produce (with an occasional exception) ninety percent red-orange flowers. So unless you wish to adventure in breeding, buy poppies grown from root cuttings from a reliable dealer. Don't fall for the delusion of potgrown plants sold in the spring. If you manage to keep the plants alive over summer, you will be lucky if they bloom the following spring, because a plant that should have a root a foot long has been stunted in a small pot.

While we have very few records of the earlier parentages in the Oriental poppy, it is very easy to make sure of your own parentage. Early in the morning select a newly opened flower with no trace of pollen on the petals or top of the seed pod. With a small pair of scissors, cut out all the stamens and place them on a sheet of paper with the name of the poppy. Keep these sheets spread out in a light dry room. The pollen ripens in a few hours and remains fertile for about two weeks. Take a paper of the pollen you wish to use and a small artist's water-color brush and cover the head of the seed pod with a layer of pollen dust. Draw the petals of the flower together and snap on a rubber band and they are safe from other pollen. Attach a label with the name of the parent + pollen parent. Most breeders plant their seed in the fall, but heaving is so severe in this climate that I have better success planting very early in the spring (about March 15th). Later in May when the sun gets hot, I place a frame covered with burlap about eighteen inches above the plants and they will continue to grow and stay green all summer. A small percentage will bloom the next spring, especially if they are given more room by transplanting in the fall.



Manchu's Fan

Of our earlier seedlings, Manchu's Fan is the only introduction we have not discarded. It is the only Oriental poppy we have seen where the green bracts extend well beyond the blooms (see illustration). The color is scarlet and we have been trying for years to produce this form in other colors, but it seems to be extremely recessive. We have one other early seedling that we are very fond of—we call it Crumples, for the petals are like a piece of crushed tissue paper. Many poppies have this effect when they first open but this poppy holds this form to the end. We have been able to carry this effect over to a limited degree. We have good crinkled red and several pink coming on. We have no parentage records on these early seedlings and no record on a few of our later ones, because they bloomed after we had abandoned the bed and removed the markers.

Everyone who sees Wunderkind considers it the most beautiful of all poppies. It is very large, has a fine heavy stem, good height (about three feet) and a brilliant watermelon pink color. It has absolutely no fertile pollen and with pollination will only produce one to three seeds in a small percentage of the pods. We have grown about fifty Wunderkind seedlings, crossed with everything we have. First generation seedlings have never shown a trace of this color but it does appear in second and third generations; but we have not produced a superior one. Glowing Rose is the only one we introduced. It is a different form of bloom and a little lighter in color. This is a seedling of Curtis Giant Flame (parentage Wunderkind + Enchantress) + 21 (parentage unknown). color a watermelon pink. Curtis Giant Flame is the only first generation Wunderkind

seedling we have introduced. Tall, heavy stems and with blooms ten to eleven inches across and while a light colored red, it is a clear red free from any yellow or change tints. I believe the three best foundations for Oriental poppy breeding are Wunderkind, Enchantress and Australia—all three carry fine height, size, stem, and vigor. Mahony (be sure you get Mahony, color mahogany purple-red) or Henri de Cayeux will give odd tints in wine colors and good branching roots. Curtis Giant Mulberry (C 70) is Mahony + Enchantress. Jessie Curtis, a medium size, profuse blooming mahogany-red, is Mahony + C 21. Raspberry Queen, a red raspberry color, is C 70 + C 80 (Ethel Swete $\times$?). We believe we have finally produced a red that will be grown for many years. It is only medium in size and height but the tint is entirely new. It is a deep red without a trace of orange and the color is so clear that either in sun or full shade it seems to glow as though the light came from within. The best description is a glowing watermelon-red. The parentage includes Wunderkind, Australia and (C 21) third generation from Wunderkind. We plan to name it *G. I. Joe*.

Production of poppies without a basal spot is comparatively easy, as some appear in almost every planting, but they are usually small in size and consequently it will take time to produce large ones in all colors.

It will take a lot of breeding to produce a white or a yellow poppy that will rank with the best we have in other colors. The yellows are still only near yellows and many burn in the sun. The whites are apt to have a grey appearance due to pollen dust and a dark blotch and are notoriously short-lived.

Why Did My Oriental Poppies Die?

L. W. KNAPP

Past President, American Oriental Poppy Society

There is no book to our knowledge upon the growing and history of the Oriental Poppy, although there have been a number of magazine articles in England and of late years in popular American magazines.

The Oriental Poppy is classed as a perennial though its behavior is different from that of many of the familiar perennials. The Oriental Poppy makes most of its root growth in the Fall and Winter, and like Peonies should be planted or reset in the early Fall for best results, if planted in the Spring it should be done before April first, but do not expect any great showing from the plant that season. We do not recommend spring planting.

The native home of the Oriental Poppy is Iran (Persia) and along the Mediterranean district. It was brought north into Germany and then into the other adjoining countries, later to this country. If it is planted in a suitable location it will last for a number of years.

Now how to make it last the maximum of years is uppermost in the minds of many poppy lovers, and the number has been increased since the introduction of the newer shades and the larger sizes which do attract attention, although the latter usually do not have as many blooms per plant per season. As to the life in years of the Oriental Poppy, it is just like people. Some plants do die younger than others. The medical profession after years of experimenting and study has been able to prolong human life by recommending certain living conditions, in other words assisting nature. By many years of study and observation to the grow-

ing habits of the Oriental Poppy experimenting with different ways of planting, times of planting, types of soil, etc., certain results seem to point to the likes and dislikes of this perennial.

The first I would impress upon you for your next poppy planting is perfect drainage; by this I mean that the water level of the soil should never be more than within six inches of the top soil. In a Spring of excessive rains, even on sloping ground, the soil becomes water logged and causes loss of many roots. A loose loam would seem ideal although I have found that roots grown in sandy soil and then reset in heavy soil have more of a tendency to rot, while cuttings taken from these same roots and grown to maturity make good stock. So in buying it would seem that roots grown on heavier soil while not as large as others, would be the best buy.

The second important item in planting is to have the top of the root system or crown planted from two to three inches below the soil level. Why? It seems that if the crown becomes exposed to the air it invites rot and we believe that very many plantings are lost for no other reason. A poppy root sprout will come up through a foot of soil if it must. If properly drained, you do not have to make it work that hard. It is like trying to kill a mole by burying it alive; it can't be done. I honestly believe you can't kill a poppy root if it is planted deep enough and given proper drainage.

Now to those who say, "my Poppy did fine for three or four years and

then died" I would say it was from one of the above reasons, excessive rains that particular season or the exposure of the crown to the air. The latter can and does come about by the foliage on a plant originally not planted deep enough pressing the earth away from the crown in its spring growth leaving a funnel just above the crown to catch moisture and be exposed to the air, on plantings you now have on which this happens when the leaves wither after blooming time we suggest that you place a trowel of earth in this funnel like hole to keep the air away from the crown. Another reason for deep planting is to prevent heaving by frost the first season prevalent in some locations, we recommend covering the planting with excelsior or straw the first season after the ground freezes, we prefer the former as it brings no weed seed, do not use leaves or manure as they pack too readily and if not removed early in the spring hold the moisture too closely to the planting.

Some have recommended planting the root at an angle of 30 to 45 degrees the idea being for drainage this may seem an advantage the first season but the natural way for the roots to grow

is down and up for the leaves and crown and that is the way you will find them after the first season, have tried planting horizontal and the second season's growth will be up and down.

For best growth of roots they should be planted in full sun true, some of the delicate shades will sun burn and fade soon, better use these varieties as cut flowers cutting them early in the morning before the bees disturb the flower sear the end of the stem after you have it proper length for your vase, this may be done in boiling water or at the stove, and they will last as long as a rose giving you days of beauty.

Nature gave us the Oriental Poppy in shades of red and orange which usually stand the sun's rays, it was through hybridizing that we now have the shades now so popular which blend so wonderfully with the many other flowers of the garden.

If you have a planting of the Orange or Red shades plant among them some of the early blooming white daisies called Memorial Daisies which bloom the same time as the Poppies and the mass of white blooms will blend your colors and avoids the clash that disappoints those that prefer the pastel combinations.

A Few Guide Posts in the Production of Strawberries

FULTON W. ALLEN

A few year ago fruit of almost any kind was considered something of a luxury. More recently studies in nutrition have shown that fruit makes a valuable contribution to human diet. Strawberries are regarded as an excellent source of ascorbic acid (Vitamin C) noted as a preventative and cure for scurvy. Strawberries were retained on the U. S. government's priority list of essential foods. In addition to its essential value it is also one of the most delectable fruits known to man.

Strawberries have an advantage of a wide geographical range growing from Florida to Newfoundland and from Southern California to Alabama, and to a lesser extent in more subtropical regions. They can be produced in about fourteen months for the spring bearing varieties and in less time with the everbearers. Production is adapted to small areas as well as large, and equipment for handling the crop is less than that needed for almost any other fruit crop. These considerations recommend strawberries as probably the most universally useful fruit crop, for the small or Victory Garden.

A sandy loam soil is ideal but satisfactory crops can be grown on either lighter or more clayey soils. Any soil that will produce good crops of garden vegetables should be satisfactory. It is well to use land that has been previously tilled as grub worms will probably give trouble where grass sod has been freshly turned. However, in areas of newly cleared land, not too sandy, excellent crops of strawberries are often grown. Sandy areas of forest land are sometimes infested with root nematode. In rolling country a slight

slope is preferred in order to provide air drainage but in this case run your rows across the slope to check erosion. It is sometimes possible to select a site having some natural soil moisture. In a dry year this will be found to be a great advantage.

The more attention paid to the preparation of the plant bed, the greater probability of success. It is very helpful to have plenty of humus in the soil for successful production. Some green crop turned under in late fall or a crop of rye or clover in the spring, giving it a chance to rot, would contribute to a successful planting. If available, animal manure spread at from five to twenty tons to the acre (one to two bushels per 100 square feet) in winter or early spring and turned under, would give the crop an excellent bed. In addition to the food value of the vegetable material, it provides an excellent reservoir for the retention of moisture.

Emphasis should be placed on the importance of moisture. Summer drouths are responsible for many failures when conditions are otherwise favorable. Overhead or trench irrigation is, of course, the most dependable answer to this problem. Canvas hose or perforated hose laid along the beds has been used to good advantage. Irrigation is in many cases impractical. The selection of a loamy soil naturally retentive of moisture, the incorporation of ample amounts of decayed vegetable matter to retain moisture, frequent shallow cultivation to check excessive evaporation are all important in areas subject to prolonged drouths. It has been noted that there is more tolerance



W. F. Allen Co

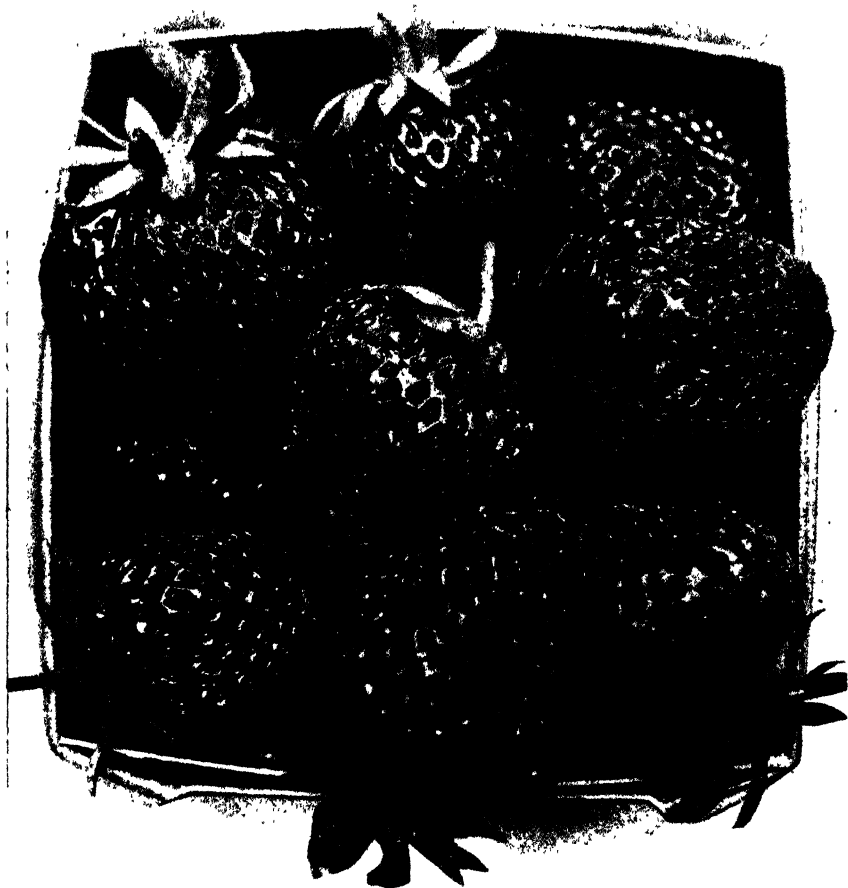
Fairfax

to dry conditions on the part of some varieties than others. Under comparable conditions, Fairfax and especially Dorsett have produced in excess of Premier in dry years.

Fertilizer and lime should be considered in connection with preparation of the land. As stated above, success with garden vegetables indicates a soil on which strawberries should be successful. In regard to lime requirements of strawberries the optimum pH value is about 5.5. However, with favorable conditions of tilth and organic matter they will tolerate a considerable range of pH value. Although strawberries are thought of as acid soil plants, on low black soils where the pH value is 5.0 or below, lime should prove beneficial but care should be taken that it be well distributed in the soil and applied not too near the time of setting plants. In this connection potash salts, which have a high alkaline reaction, are not generally regarded as having food value for strawberries except pos-

sibly in low fertility soils or on mature beds. On high fertility soils or where ample amounts of animal manure have been used, little commercial fertilizers may be needed. Generally, however, an application of 600 pounds per acre (1 lb. to 20 ft. of row) of 5% organic nitrogen such as tankage, fish or dissolved bone, and 8% super phosphate stirred well into the soil should prove beneficial. It should be emphasized that salts of nitrogen or potash are injurious to roots of plants if they come in contact with them. Applications of fertilizer to mature beds can be made if needed in late August or early September of 600 pounds to the acre of a 6-8-2 fertilizer, care being taken to apply when dry and to brush off the foliage immediately.

Fall planting in states below North Carolina is perhaps as general as spring planting. In the Middle states March and April; and in the Northern States above New York City, April and early May is unquestionably the best time

*Dorsett*

to make plantings.

Despite its range, the strawberry is a cool weather plant and it is important that they be well established while cool and moist weather prevails. Furthermore, young plants made early in the season are better able to produce fruit than young fall made plants.

Plants should be set soon after arrival. If that is impossible due to bad weather or any other cause they may be kept in the shipping container in

cool storage, your refrigerator if there is room, or a snowbank, but not exposed to sun or wind. In case they have to be kept for a week or more in warm weather and no storage is available it is best to dig a V-shaped trench about six inches deep. Open the bunches, wet and spread them so that soil will be in contact with all the roots, fill in soil up to the crown and soak well with water. When ready to plant, a cool cloudy day is best, at least be



W. F. Allen Co.

Fairfax

sure that the roots are not exposed to sun and wind longer than is necessary.

Plants should be set in rows $3\frac{1}{2}$ to 4 feet apart, 18 to 20 inches apart in the row. In small gardens these distances may be closed up a little. With the hill system used in the lower south, and sometimes with everbearers these distances do not apply.

The roots should be set straight down or slightly spread, using a spade or long trowel. In this operation care should be taken that the earth be well packed around the roots, using the toe of the shoe for this purpose. Sometimes where larger plantings are made by hand, the plants are "walked." After planting one walks directly on top of the plants, the crown fitting into the instep. Large commercial growers use horse drawn transplanters. It is very important that the bud or crown be set **exactly** at soil level and care should be

taken that bud not be covered during cultivation, or else uncovered directly.

Subsequent attention involves cultivation and training. Where the area justifies horse or garden tractor cultivation is done between the rows and should be done carefully so as to stir the ground as close to the plants as practical to save work with the hoe, but as cautioned above not to cover the plants. Hoeing should be done one to one and one half inches deep to keep the soil friable that runners may be able to root, to loosen the soil to conserve moisture during dry weather, and to destroy grass and weeds. During the operation of hoeing it is a good time to do the necessary work of removing the fruit buds as it weakens the plants to bear during the growing season. This practice in the case of everbearers is followed until about August 1st.

The training of new runners is an important part of the hoeing operation. Plant beds should not be allowed to become too thick as larger and better berries are obtained where each plant has room to properly develop. Four to eight plants to the square foot is plenty, but exact spacing is not necessary. When a satisfactory row has been attained, subsequent runners should be removed.

Too much emphasis on the question of insects and diseases may tend to discourage the prospective grower of strawberries. Part of these troubles are somewhat local in their prevalence. Root nematode and grub worms have been discussed. Cut worms which eat succulent parts of plants in early stages of their growth are controlled by the use of 10 lbs. bran $\frac{1}{4}$ lb. arsenate of lead and one pint of molasses, adding enough water to make a dough and placed near each plant as a bait and poison. The strawberry weevil may appear at blossom time or just before and cut off the fruit buds at the tender stage. Dusting as they first appear with 85% dusting sulphur and 15% calcium arsenate, repeating if necessary, is recommended. Do not dust after berries are half grown. The best possible disease control is to procure disease free stock and plant in land not recently used for strawberries. Selection and breeding of disease resistant varieties is being done by the U. S. Department of Agriculture and some state experiment stations.

Mulching is practiced particularly in the north and for the following purposes; to avoid early bud freezing; to avoid thawing too quickly thus causing plants to be lifted partly out of the ground; to discourage weed growth; to delay blossoming; and to keep berries clean. Application of straw or marsh grass is made by covering the beds lightly just before hard freezing.

Of the early varieties, Premier is doubtless least affected by late frosts, and is productive and profitable in the North, and middle States. Fairfax is of excellent quality, productive and beautiful becoming dark red when fully ripe but retaining a remarkable firmness. A northern and middle states berry. Dorsett excellent in quality, size and firmness is almost as productive as Premier. Blakemore, while of not as good quality as Dorsett or Fairfax, is a bright, very firm and productive berry, adapted to the lower middle states and the South. Firm and of very good quality is Midland a new second early.

Of the midseason varieties, Catskill is a leader. Berries are large, firm and of good quality. Adapted from north to upper South. Big Joe is a good middle states, midseason berry. Chesapeake has long been a leader among the late berries. It is firm and of excellent flavor, but needs good soil for good plant growth.

Two new late berries, firm and of good quality are Starbright and Redstar. As soon as sufficient plants are available they are well worthy of your attention.

Everbearers should really be treated in a separate article as many phases of handling the crop are different, although cultural practices are essentially the same. Mastodon and Gem are two of the standbys. Other varieties of Everbearers new to the public are being offered, some doubtless meriting a place in your garden.

No summary of the above article is being offered. The article itself is a summary, in some respects inadequate, but it is offered in the hope that it may help some to a better understanding of a few of the factors involved in the production of this delightful fruit.

Experiments With Seeds and Plants

ROBERT M. SENIOR

In recent years many experiments have been made with the view of hastening the germination of seeds, and of stimulating plant growth. An account of some of these experiments, and of the conclusions arrived at, may be of interest to the amateur gardener.

A leaflet published by the Extension Department, College of Agriculture, of the University of California, describes experiments on plants, with the use of Vitamin B¹ (thiamin). About 25 plants were chosen, and kept under greenhouse or field conditions. With possibly two or three exceptions, none of the treated plants showed any improvement over the untreated ones. Similarly the claims that watering the plants with thiamin, or soaking the roots with it, would prevent wilting, could not be verified. The conclusion arrived at was that thiamin appears at present to hold no general practical utility, and that "claims for its general effectiveness were not founded on fact."

Many of us who have planted seeds, and have had unsatisfactory or slow germination, are often inclined to lay the blame on nurserymen for sending out old seeds. Of course we know that seeds of hawthorn and holly are slow to germinate, but when we purchase seeds of herbaceous plants, we generally assume that they will come up with reasonable promptness. However there may be factors inhibiting germination of which we are entirely unaware. For example, in a study of certain *Amaranthus* and *Celosias*, it was found that the seeds of these plants had an aversion to light, and if the seed bed was kept dark, the germination was excellent. On the other hand,

with certain other seeds such as various species of *Lobelia* and *Veronica*, best results were obtained when the seeds were planted almost on the surface of the seed bed, and kept in full light. *Primula obconica*, *Ramondia pyrenaica*, and one or two species of *Draba* and *Mimulus*, almost failed completely to germinate when the seed bed was kept dark.

Even the temperature of the room in which the seed bed is placed, frequently has an effect on germination. In experiments with Juniper seeds, it was found that when the temperature was kept at 40 degrees Fahrenheit, germination was greater than when kept at 50 degrees. Even before the seeds were planted, it was found that a very low temperature was injurious unless the seeds were kept dry. Furthermore, after the seedlings appeared, those kept at a temperature of about 75 degrees grew fastest, although those kept at 60 degrees appeared most healthy.

The Boyce Thompson Institute conducted a series of experiments on the germination of seeds of alpine. As in the previously mentioned experiments with Juniper seeds, it was found that the temperature at which the seeds were kept before being planted, had a marked effect on germination. For example, the seeds of *Campanula barbata* kept at about 40° F. for three weeks, and then planted, germinated in one week. On the other hand, when these seeds were kept for three weeks at a temperature of about 70°, and then planted, the germination was very unsatisfactory. Of course, this and similar experiments only tend to confirm our actual experiences with the seeds of alpine, which we know, in the

case of many species, must have cold pretreatment before they will germinate satisfactorily. Hence the rock gardener plants seeds in pots or pans during the winter months, in order to have early Spring germination. In this connection, it might be worth mentioning that roses, dogwood, apples, pears, and conifers generally require similar treatment.

In order to hasten germination, seeds have been immersed in various chemical solutions before planting. Among these chemicals used, apparently in some instances with good results, are indolacetic acid, sulphocyanate, ammonium thiocyanate, and hydrogen peroxide.

In regard to cuttings, experiments have indicated that some plants root

faster when the stems are cut at the nodes, whereas stems of other species should be cut at the internodes. Clematis cuttings, for example, root faster when stems are severed at the internodes.

Sometimes callus forms at the base of cuttings, and yet these fail to throw out roots. It has been found that often if a small piece of the callus is cut off, and then the stem is reinserted in the sand, that roots are induced to form. Incidentally, if after making cuttings of evergreens, some resin should exude, it is very beneficial to dip the ends in water that is almost boiling, before inserting the stems in the sand. Apparently this procedure tends to seal the resin canals, and stimulate the formation of callus

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Some Like It Hot

The kind of "hot" my garden knows is that produced by the direct rays of the sun through dry air in the latitude of Washington, D. C., 6,000 feet high in Colorado, intensely hot in summer sunshine, correspondingly cool in shade. "You may cool off in the shade of a telephone pole." It would be interesting to know whether plants which revel in this almost desert climate will behave as well in humid heat. The tolerance of plants is a never-ending surprise.

When the April, May and early June glory of the Rock Garden has dwindled out with the last flicker of primula and phlox there begin to bloom a few sturdy heat-loving things that flower literally all summer. Some of them slow up for awhile to catch their breath and go

on again till frost and after. The best of these are:

Crassina grandiflora
Melampodium cinereum
Galpinsia lavendulaefolia
Gilia nuttalli

Crassina grandiflora forms in time a loose mat about a foot in diameter and six inches high, with slender stems and leaves, beginning diffidently to flower in June; by July and August it makes a splurge of not-aggressive yellow. Individual flowers are self-sufficient looking daisies formed of wide over-lapping bracts rounded at the top, the center a disk corolla of deeper yellow, the whole making an attractive plant. Its secret of long flowering is this bract business; bracts retaining their color when petals would have been dead and gone. The color varies from deep burnt orange



K. N. Marriage

Crasinia grandiflora



A. N. Marriage

Galpinsia lavendulaefolia

through sulphur yellow to creamy white. Plants have long woody roots with few fibers and resent transplanting except when quite young. Seed germinates eventually.

Melampodium, Colorado Rock Daisy, has wide white rays with a yellow disk center. Its wiry stems branch from the base, narrow silvery leaves are sparse. A mature plant may be one or two feet in diameter and six to eight inches high. Its continuous flowering is another case of bracts. Plants tend to be impermanent. Young roots are fibrous and transplant without a protest. Old roots are woody. Seed germinates rather readily.

Galpinsia lavendulaefolia while less steadily industrious is the winsome flower of this summer flock. Knowing some of the coarse, big, sticky "Evening Primroses" it is difficult to realize that this exquisite flower is their first cousin. Again stems and leaves are slender and inconspicuous, stems spreading so that the plant is not more than five inches high. The flowers borne in axils have four crinkled yellow petals of silkiest texture, softly yellow in youth and middle age, changing to apricot and orange tints as they reach senility. An attractive old age! The stamens emerging from a deep central well give to the flowers a just-wakened-up appearance. Its ease of culture is in inverse ratio to its beauty. Slender long woody roots defy transplanting except in babyhood. Seeds germinate for the patient gardener. A few dozen cuttings put in sand under an inverted battery jar last summer have rooted one hundred per cent.

Gilia nuttalli while its home is in the high, cool places is adaptable and happy even in the hot summer. Its habit and flowers are like low-growing phloxes, stems radiate from the base forming a rather symmetrical plant and the terminal clusters of white flowers

snuggle down into a tuft of foliage. The leaves are a clean, bright green giving the plant a fresh, crisp air even in the dog days.

These descriptions apply to plants grown in full sunshine in a rock garden whose foundation is gravel and chip rock with a surface of about four inches of sandy loam. *Gilia nuttalli* is the only one of the quartet whose home is in acid peaty loam. The other three are found in rocky shale and even in stiff alkali clay but always where they are assured of a dry winter. It is possible that rich food and much drink would render them lush and less desirable as rock garden plants.

KATHLEEN MARRIAGE,
Colorado Springs, Colorado.

Desmodium

Fall blooming shrubs are not too plentiful, consequently, when we find one with the fine qualities of the *Desmodium*, it is highly appreciated. As I write this, the first week of September, the plant, (one can scarcely call it a bush), is becoming a perfect mound of deep rose, with just a shading of purple. The *Desmodium* dies to the ground each fall, then in the spring sends up many slender, wand-like stems which grow head high in a well established plant and droop gracefully in all directions with the weight of its wealth of dainty pea-shaped flowers. They crowd the stems in heaps and clusters, almost completely hiding the delicate pinnate leaves.

The slender stems are thickly branched and every one of these branches and their branchlets are packed with the small rose pea-flowers. The buds next the stem open first and last for days with new buds crowding in where there seems no possible place for them. When the season suits this plant there is no more gorgeous sight in the fall garden than a mound of in

along about its second week of blooming. The big heavy sprays droop over onto the ground and simply pile up. It has two traits that is on the other side of the ledger, however, for if the season is not to its liking one thinks it not worth bothering with for there are but scattering blooms. Then it definitely is not a good cut flower for the color fades and the blooms rattle off. In spite of these two quirks, it is a grand garden brightener, and worth enduring in its few off years for the wonderful display it makes when at its best.

A hedge of this shrub as a background for low growing flowers, of just the right shades, would be a delightful garden picture. I have a big clump of it directly back of a sheet of rose verbenas, which certainly is *not* a pleasing arrangement, lovely as each are. One or the other is going to be moved before another spring.

The *Desmodium* is quite attractive earlier in the season, too, as the leaves are delicate and combine prettily with the gracefully drooping stems. As soon as the leaves fall in the autumn I cut it back to the ground, so, at no season of the year does it detract from the garden picture. If I were called upon to

pick any number of choice, perfectly hardy shrubs, I think the *Desmodium* would be among the first.

Violet "rosea"

Here is another beauty for the fall garden. The leaves are low and compact, not rampant like the blue violets. In the summer they do not do much growing and appear to be resting, but with the first fall rains there will be a wonderful fragrance to meet one some morning, announcing the first insignificant little pink bloom. You have to hunt for it to even find it. Just as soon as the days become slightly cooler it really shows its merits. The flowers come crowding up all through the dark leaves, a bright vivid, real pink, with long stems and good size. Frost, or even a pretty hard freeze does not bother them in the least. All during the winter there will be clusters of the sweet things ready to pick, if there is any good weather at all. A deep freeze kills the flowers that are open but with a milder spell of weather and a little sunshine they come on again, until the really warm spring days, then they rest for another summer.

MRS. H. P. MAGERS,
Mountain Home, Ark.

Rhododendron Notes

CLEMENT G. BOWERS, *Editor*

The Height of Kurume Azaleas

Azalea varieties called *Amoena* and *Hinodegiri* have long been known in this country. Probably both of them are Japanese, although *Amoena* was for some time assumed to be Chinese in origin, having been brought in from Shanghai about 1850 by Robert Fortune. Nearly everyone is familiar with

their compact, dwarf habit. It has been said that other dwarf varieties of the *Kurume* type were brought here for the first San Francisco Exposition of 1915, but these were lost to sight and it was not until 1919 that the late E. H. Wilson, on a visit to Japan, selected fifty kinds and had then shipped to the Arnold Arboretum. These came in

under Japanese names. Later Wilson renamed some of them, giving them names which bore no relation to the meanings of their original Japanese counterparts (which generally could be translated as something poetic, such as "Snow in the Evening," "Flying Dragon," "Above the Clouds," "Giraffe," etc.). These were tested, found tender in New England, but disseminated to the trade and recommended as greenhouse subjects and as garden plants for mild climates. Most of them did not prove sufficiently hardy for outdoor culture except in sheltered places on Long Island and southward. Being easy to propagate from cuttings they were extensively grown by nurserymen and today are popular where the temperature is mild. Being compact and floriferous they were used in hybrid combination with other azaleas of the "Indian" or greenhouse type and have given rise to one or more races, such as the "Rutherfordiana" hybrids of Bobbink, showing intermediate characters and good commercial pot-plant qualities. Many of Wilson's original Japanese introductions have now passed out of sight, while a good many new varieties have arisen, apparently as seedlings from Kurume parentage.

Now the original Kurume azaleas, as described by Wilson, are of dwarfish habit, "seldom a metre tall, more usually less than half of this, and quite commonly they are prostrate or hug boulders closely. The habit is normally dense and twiggy, but when sheltered a few strong shoots develop and the plant becomes relatively tall and sparsely branched." Elsewhere Wilson describes the wild form as growing on windswept mountainsides, where it extends to above the tree line. In Japanese gardens it was likely kept dwarf by constant clipping, although naturally dwarf forms, similar to our *Amoena* and *Hinodegiri*, must surely have oc-

curred and were probably the ones selected for naming. In this country, too, the belief in their inherent dwarfness was kept alive by the fact that the seedlings were all young and, being compact anyway, did not develop height for some time. So the legend has gone on that Kurume azaleas are dwarf and will not exceed three feet in height.

Recently, however, a good many seedling plants, purportedly of Kurume origin, are getting older and are growing up into bushes nine feet tall in this country. The question arises, Are they Kurume azaleas? And, if not, what are they?

In his "Monograph of Azaleas" (1921) Wilson places the Kurume Azaleas in the same species with *Kaempfer's* azalea, calling them merely different forms of the same species and stating that intermediate forms exist. Horticulturally, however, the differences between the Kurumes and *Kaempferi* are so significant that most other modern writers have preferred to keep them as separate species. These distinctions would seem to be somewhat parallel to those between two common American azaleas, *R. nudiflorum* and *R. roseum*, which likewise have intermediate forms.

Recognizing the extreme amount of variation which naturally occurs in both *R. Kaempferi* and *R. obtusum* (the supposed wild form of the Kurume azalea, which grows on Mt. Kiri-shima), it would seem that the character of dwarfness may not be a stable feature of Kurume azaleas, but that dwarf individuals occasionally occur and that these are the ones which have been selected as standard bearers for the race. The prevalent Japanese habit of clipping azalea plants, also, would tend to confuse an observer, especially if the only plants seen in the wild were growing on a high mountain where the

ecological conditions kept them small. The fact that Wilson noted wild plants growing taller in sheltered places indicates that this might be true.

One other possibility should not be overlooked. It is that the tall-growing American Kurumes might possibly be seedlings from open-pollinated flowers and are in reality hybrids with some larger species, such as *R. Kaempferi*, and hence not true representatives of the Kurume race.

Whatever the cause of the increased height of these American azalea seedlings, it would seem improper to call them Kurume azaleas until such time as it is known that the original Kurume varieties are capable of growing beyond the generally accepted height limit for the class, which would be about three feet or so. While the dwarfness may be an artificial character, nevertheless it is so associated with the appearance of this cultigen group of plants that I would rather call the taller sorts merely "Obtusum seedlings" and reserve the name Kurume for those that follow the original size pattern.

Mound-layering of Deciduous Azaleas

In one of the older nurseries in England, there was one section of the grounds given over to the propagation of deciduous azaleas by this long-known but little used variation of the familiar system of layering. The site was level, somewhat shaded by trees, with a fertile soil made rich in humus but with excellent drainage to prevent any stagnation and yet allow a relatively high and even water table. The bushes were

spaced about six feet each way and were already very old.

In the beginning, the young plants had been allowed to grow until well established cutting them to the ground as needed to cause a great number of stems to form. When there were a goodly number, the whole base of the plant was covered with a mound of loose, peaty soil mixture so that after settling some six to eight inches covered all the bases of the stems. In about two years, the bases of all these stems had made a good mass of fibrous roots and could be cut off, after the mound was cleared away to facilitate the work, and lined out in the nursery to continue life on their own roots.

The plant was allowed two years to produce a new crop of shoots and then was subjected to the same procedure. Obviously each succeeding semi-interment produced an ever-increasing number of plants since the number of sprouts was increasing.

In practical nursery work, there is the necessity of maintaining several plots of "mother" plants in order to maintain a constant supply of material ready to be removed.

For the gardener who wishes to increase some deciduous azalea which does not root easily if at all from cuttings, this is an easy method, since he need not carry it to an extreme and if he entertains doubts as to the capacity of deciduous azaleas to recover, all he need do is to look at some bit of woodland recovering after a fire and see the regeneration of the old stumps which fire has not killed by any means.

Lily Notes

DR. GEORGE L. SLATE, *Editor*

Chinese Lilies Discovered by French Missionaries

HELEN M. FOX

Nine new species and two varieties of lilies were discovered in China by French priests, the Abbés David, Delavay and Farges. These three, and Abbe Jean-André Soulié, also found lilies that had been discovered by previous explorers. The four French priests were brothers of the order of St. Vincent de Paul and called Lazarists after the mother house in Paris. Abbé Armand David was the greatest scientist among them and went on three exploring trips to collect birds, mammals and other specimens of natural history, as well as flowers. He sent back 1,500 herbarium specimens of plants new to science. Hundreds of plants are named for him besides *Lilium Davidi*, such as *Clematis Armandii*, *Prunus Davidiana*, *Rhododendron Davidsonianum* and the genus *Davidia* of which the one species *involucrata* is a tree with floral bracts like fluttering handkerchiefs. A distinguished botanist was Abbé Jean-Marie Delavay who sent back thousands of herbarium sheets, 5,300 of them species, of which 1,800 were new to science. Many of his discoveries are called *yunnanensis* because Yunnan was his territory, or *Delavayi*, as with a rhododendron, a peony, and a magnolia. An obscure priest devoted to his flock, living in the mountains of Eastern Szechwan, was Abbé Paul Guillaume Farges. Among the plants he discovered are *Lilium Fargesii*, *Berberis dictyophylla*, *Ilex Fargesii* and *Rhododendron Fargesii*, to mention only a few of the 2,000 species he sent

back home. Farges collected in order to secure money for his parishioners. There were other plant collecting priests who did not discover lilies. Among them were Abbé Guiseppe Giraldi and Abbé Bodinier.

The tradition for priests to send home plant material was an old one, the first Frenchman to do this being Father Incarville, stationed in Peking in the mid-eighteenth century, for whom the genus *Incarvillea* was named.

The priests were sent to China primarily to convert the people to Christianity but also to make friends for France. They were carefully educated and trained variously as scientists, teachers or doctors and all were taught Chinese before being sent to their stations. Since they lived in one place for a long time, they had an excellent opportunity to gather plants.

The intensification of collecting in the second half of the nineteenth century from David's first trip in 1865, to Farges' last specimens to come back in 1903, and Soulié's in 1905, was largely due to increased interest on the part of France, in Chinese affairs, from the commercial, scientific as well as the artistic points of view. In Paris there was a group of scientists who encouraged collecting by raising money and obtaining permission from the Abbé David's superiors for his explorations and by making him, as also Abbé Delavay, ministers of public instruction to help them financially.

At the Sorbonne, Pierre Étienne Duchartre was professor of botany from 1861 to 1887. He was primarily a describing botanist and wrote copiously on plants. Among his writings is the *Observations Sur le Genre Lis*, pub-

lished in 1871 and based largely on the catalogue of Max Leichtlin's collection in Baden which had been assembled with the help of Kew and the Botanical Garden of St. Petersburg. A. Franchet, a systematic botanist, was at the Musée d'Histoire Naturelle in Paris from 1880 until his death in 1900; his title was Repetiteur du Laboratoire des Hautes Études and he was interested in the geographic origin of plants. After naming collections from Japan, he was given the collection of Abbé David to determine and published this work under the title of *Plantae Davidianae*. Franchet also published two parts of Delavay's collection, entitled *Plantae Yunanensis* but died before he could complete the work. In an article, *Plantes Nouvelles de la Chine*, published in the Bulletin of the Musée d'Histoire Naturelle de Paris, Vol. IV, he described plants found by Delavay, Farges and Soulié. On the subject of Lilies his article *Les Lis de la Chine et du Thibet dans L'Herbier du Musée de Paris*, published in 1892 was highly important, of which more later. Franchet wrote with extreme clarity while Duchartre was discursive and sometimes difficult to follow.

French collectors were more interested in the science of botany than in horticulture. Perhaps they were so accustomed and so pleased with their formal gardens composed of few varieties of plants that new introductions did not entice them so much as they did the English. However, thousands of new plants were grown in the garden of the Musée d'Histoire Naturelle. Elie Abel Carrière, a great gardener, and chief of the nursery from 1852-78, wrote about the Chinese plants he grew. Not far from Paris at Verrières les Buissons was the establishment of the Vilmorin family, whose firm Vilmorin-Andrieux et Cie sold plants throughout the vast French Empire,

was keenly interested in exotics and introduced many of them. In 1906 Philip de Vilmorin published the catalogue entitled *Hortus Vilmorinianus* of shrubs, trees and herbaceous plants grown in his own garden as well as the adjoining nursery. In 1904 the Bishop Maurice de Vilmorin issued a catalogue of shrubs in his garden, *Fruticetum Vilmorinianus*, in collaboration with D. Bois of the Musée d'Histoire Naturelle. In these catalogues when the plant was a new species, it was described and there were cultural notes about it. In each of these remarkable collections over 6,000 plants were listed.

However, much of the material sent from China to be grown was destroyed or lost and with the lilies, even after they had been raised, some of them disappeared, as is their habit. Thirty years after Delavay's specimens came to Europe a group of English collectors was sent to Western China to collect the lost plants again, among them were George Forrest, J. F. Rock and E. H. Wilson, who went over the same territory as the French and found drifts of *Duchartrei* and *myriophyllum* high in the mountains and *ochraceum*, *Bakerianum*, var. *Delavayi* and *Fargesii* in the valleys. The second series of explorers sent back seeds and bulbs, some to persist and others to disappear.

The rule in botanical nomenclature, as most people know, is for the first description to be published in Latin to have priority as to name. Often there are conflicts in dates and then for a time confusion results as happened with *Lilium Davidi* var. *Willmottiae*, called *Thayerae* and *Lilium Duchartrei* called *Farreri*. Frequently botanists re-examine and reclassify species, or even move a whole batch of plants from one genus to another as happened with several of Delavay's discoveries, first classified under lilies, but since

1934 placed under a new genus, *Notholirion*. The botanist who names the plant affixes his name, so it is known who is responsible. The majority of lilies sent home by French explorers have Franchet appended to their names, but Duchartre, Carrière and Levillé also appear.

Of the four priests, all were born in mountainous or hilly parts of France. From early years they had been accustomed to long walks over difficult terrain. Abbé David wrote that if he had not been a Basque, he could never have stood the rigors of his travels. It can be imagined how delighted Delavay, Farges and Soulié must have been to find their lonely stations, far removed from companionship of their own kind, to be in surpassingly beautiful country. David travelled to these mountains and valleys.

In these high mountains of China and Thibet were all climates from mild in the valleys to above the timber line high towards the peaks. Though the valleys were high in altitude their climate was not extreme and here it was that drifts of white, yellow, orange and pink lilies grew. In the alpine meadows were quantities of new primulas, gentians, delphinium, aconites, clematis, anemones, peonies and cypripediums to mention only a few of the flowers. On the slopes were forests, some of them rich in glossy leaved magnolias and others colorful with vividly flowered rhododendrons. Along roadsides and from cliffs grew hundreds of shrubs and herbs unknown in Europe.

In his paper *Les Lis de la Chine et du Thibet*, mentioned earlier, Franchet claimed David, Delavay and Farges had discovered 24 lilies. The number, however, was reduced to nine species and two varieties by the time the sections of the Supplement to *Elwes Monograph of Genus Lilium* were published from 1933 to 1940. As a result of the

discovery of these lilies from the mountains of Western China merging into Thibet, says Franchet "it can be affirmed the mountains of China are the principal source of lilies (as they were of *Rhododendron*, *Primula*, *Lonicera*, *Rubus*, *Vitis*, etc.). Many lilies previously found have come from cultivated sources where they had been changed from their wild state, for it is well known Chinese and Japanese gardeners are masters at transforming plants." Franchet wrote he did not think the shape of the perianth a permanent character for placing lilies because cultivated forms differed in this respect from the wild. Moreover "—sometimes the direction of the perianth divisions either upright or revolute do not show themselves completely until late in the development of the flower and generally only after fecundation." The characters he used for determining species "were constant such as the filaments, smooth in most species which are however hairy papilaceous in others and the only character to distinguish *L. Brownii* from *L. longiflorum*; the type nectar furrow which in some species can be reduced to a median nerve, very slightly depressed but always covered towards the base with a sticky fluid, e.g. in *L. cardiocrinum* and *L. speciosum*."

Three lilies are credited to Abbé David, namely, *L. Davidi* Duchartre, *L. Duchartrei* Franchet and *L. cathayanum* Wilson.

Abbé David wrote delightfully of his three journeys. The first two were published under the title *Journal d'un Voyage en Mongolie, Chine et Thibet*, in three bulletins of *Nouvelles Archives du Musée*. The first journey in 1865 took him to Southern Mongolia, the second from 1868-70 to Central China as far as Moupin in Thibet. The account of the third journey from 72-74 undertaken in Shensi, Szechwan, Ki-

angsi, and the mountains of Foukien was published in *Troisième Voyage d'Exploration dans L'Empire Chinois*, in 2 small volumes in 1875. The discoveries and diaries created such a stir that numerous accounts appeared in scientific as well as lay journals and three articles about them came out in the *Revue des Deux Mondes*, the French counterpart of the *Atlantic Monthly*. With Dr. Oustalet, David wrote *Les Oiseaux de la Chine*, an account of the birds he had collected and in addition many articles in scientific and Catholic journals. He was a brilliant scientist, a remarkable teacher as well as a very religious and lovable man.

The following notes on lilies have been collected from French sources and were checked in H. J. Elwes, *Monograph*, the Elwes supplement by A. Grove and A. D. Cotton, *The Lilies of Eastern Asia* by E. H. Wilson and *Lilies* by H. D. Woodcock and J. Coutts.

According to Abbé David's note on the herbarium sheet, he found *Lilium Davidi* Duchartre in flower near borders of Thibet in high mountains which separate Moupin from Szechwan, on July 1869. Franchet thought this lily not distant from *L. speciosum* Thunb. Abbé David did not remember the color of his lily and told Mr. Elwes, who was in Paris getting material for his *Genus Lilium*, it was yellow and thus *Davidi* was colored incorrectly in the *Monograph*. Consequently when a deep-red, spotted lily was collected by Abbé Farges in the district of Cheng-kow-tin on the border of Shensi and also by Prince Henri d'Orléans at Tatsien-lou in Szechwan it was called *Lilium sutchuense* Franchet, and considered to be a new lily. Later the whole subject was unravelled, *L. Davidi* was known to be orange and *L. sutchuense* is now classed as a variety

of *L. Davidi*. It varies slightly from the type by having longer and broader, flat leaves, no hairs on the leaf bases, somewhat longer pedicels and a glabrous perianth.

L. pseudo-tigrinum Franchet found by Abbé David, is now known to be var. *Willmottiae*.

As for *Willmottiae* Wilson, discovered by A. Henry, it was first thought to be a separate species but now in spite of its creeping rootstock and weak stem, it too, is classified as a variety of *Davidi*.

Philip de Vilmorin grew *L. sutchuense* Franchet and notes it as a new species, says it was introduced from China ten years ago (in 1896) and that it is close to *L. tigrinum* but differs by a long catalogue of characteristics. He wrote "—it is distinct by a slenderer stem, not bulbiferous, more numerous and narrower leaves, flowers more finely dotted and smaller, is much earlier blooming and has stoloniferous bulbs. The plant is fertile and I raise quantities of seeds every year but it is difficult to bring them to flowering bulbs, which has not prevented me from extending it in the plantings." The last sentiment bespeaks the lily enthusiast.

At the foot of Mt. Moupin in Eastern Thibet on July 1869, Abbé David found *Lilium Duchartrei* Franchet. Later it was found in Szechwan on the mountains around Tatsein-lu by the Prince of Orléans and in the woods of Koutoui above Mo-so-yn in Yunnan by Delavay on July 17, 1889. Of the three specimens sent home by David from the mountains of Moupin, 2 are in Paris and one at Kew. David's label bears the words "fleur blanche pointellé de pourpe." The amount of wine purple coloring varies, some flowers are intensely spotted and there are handsome striated forms. Abbé Delavay found a lily in Yang-in-chan simi-

lar to *Duchartrei* but with purple flowers more or less spotted with brown, and the segments narrower and more pointed at the base than the type and having linear lanceolate leaves. After much speculation this specimen has come to be considered as a single different plant. Duchartre thought the lily was a form of *speciosum* and named it thus in a small label in his handwriting attached to the herbarium sheet. So when Franchet re-examined the specimen eighteen years afterwards and decided it was a new species, it was named for Duchartre and the description and name were published in *Plantae Davidianae*, part II.

Abbé David discovered *L. cathayanum* E. H. Wilson in 1868 in shaded places and glens around Kuling in Kiangsi province. Wilson named it and gave as synonyms *L. cordifolium* Franchet and *L. giganteum* Franchet. But these names do not appear in *Les Lis de la Chine et du Thibet* nor are they in *Plantae Davidianae*. According to Wilson it is the least attractive and smallest of the section *Cardiocrinum*. According to Woodcock and Coutts it is a sombre looking lily close to *L. cordatum* but dwarfer with stem leaves longer than broad and uniformly kidney shaped. They say "—it differs from *L. giganteum* in the curious arrangement of the foliage on its 2-4½ feet high stem which is generally naked on its lower part and then at mid-height has a sort of whorl of long stalked leaves and above them a few much smaller and scattered leaves."

The lily discoveries of Abbé Delavay were more numerous than of any other traveller. They were *L. myriophyllum* Franchet, *L. ochraceum* Franchet, *L. taliense* Franchet, *L. lankongense* Franchet, *L. papilliferum* Franchet, and the variety *L. Bakerianum* var. *Delavayi* Wilson. He also found the

handsome plant called *L. Yunnanensis* by Franchet but later given the name *L. Bakerianum* Collett and Hemsley, because that name had been published earlier.

The territory covered by Abbé Delavay was principally Northwest Yunnan, near Lake Tali where he was stationed for 14 years from 1882-96. Besides collecting in Yunnan he collected in the province of Kwantung, where he was first stationed and on the island of Hainan. He also gathered plants as he travelled to his post in Yunnan going indirectly by way of Hupeh and Szechwan.

Delavay often went back 3 or 4 herbarium specimens of the same plant and sometimes he would get it in flower, again fruit and would go a third time to find bulbs or roots. His specimens were known for their artistic quality and considered models for study.

Delavay's most dramatic discovery was *Lilium myriophyllum* Franchet found at Mo-so-yn in stony places amid shrubs, not far from Lan kong, about 40 miles northwest of Lake Tali. The numbers and dates of his specimens in Paris are No. 3273 July 29, 1888, No. 3817 July 5, 1889 and No. 4784 July 12, 1889. The field labels describe the flowers variously as "blanc, pâle or blanchâtre." One of the specimens shows the segments suffused with dark color outside and only one. No. 3817 has bulbils. Franchet used the name *myriophyllum* in *Les Lis de la Chine et du Thibet* two weeks ahead of "*sulphureum*" used by Baker for a Burmese specimen. Franchet said of the plant "Magnificent species similar to *Lilium Wallichianum* Schult. with numerous linear leaves but very different rhizomes, direction of flowers and wide shape of perianth." Eduard André, French landscape architect considered "it is one of the most beautiful

plants introduced in recent years and grew it in his garden near Geneva. Maurice de Vilmorin described it and published a picture of it in *Revue Horticole* in 1914. The plate in the Elwes supplement shows a breath taking lily with a racemose inflorescence of very large somewhat drooping funnel form flowers having slightly revolute segments, slender, numerous, pinnate leaves and brown bulbils in the axils. The flowers have a strong scent.

Unfortunately the lily is not hardy, but a hardy cross called Crow's hybrid of *L. × sulphurgale* (from *sulphurcum* and *regale*) × *L. Princeps* shows characteristics of *L. myriophyllum*. In this hybrid there is a lot of green and red on the back of the flowers and green-yellow in the throat and a green nectar furrow at the base of each segment.

L. ochraceum Franchet was discovered by Abbé Delavay in the shrubbery of Kan-hay-dze July 29, 1883. He found it again in mountainous woods above Tapin-Tze and a third time four years later, on August 20, 1887, at the foot of Tchang-chan at an altitude of 9,000 feet. He sent back three specimens. Franchet wrote "... *speciosum*, *ochraceum*, *taliense* and *polyphyllum* are the only four of the Asiatic Martagon Group where the nectar furrow is bare of papillae. This lily is characterized by a long, narrow bulb, the other three and *Duchartrei* have the bulb of *L. Martagon*." It grows around Mengtsze in Yunnan where heavy summer rains prevail, the temperature is not excessive and frosts are unknown. Stems 4-5 feet high carry a few nodding fairly large flowers $3\frac{3}{4}$ " across yellow-tinged-green and marked with red magenta on the lower third of the segments and spotted all but the tips with the same color. Though it sounds strange and even ugly, yet it is odd and attractive, but not hardy. It is

said to have a pleasant fragrance in the evening.

Two specimens of *Lilium taliense* Franchet were sent home by Abbé Delavay both from Yunnan. One was picked at the Col de Koua-la-Po at a point where the road culminates from Tali to Kohin on July 24, 1883, and the other above Mo-so-yn at Koutsou an open rocky hillsides on July 17, 1889. The lily is very like *L. Duchartrei* but differs in stamens and nectary says Grove, also the stem of *L. taliense* is brown and not green, the leaves narrower and more numerous, the flowers are white or tinted and it is known as "the other Chinese white flowered martagon." It has been grown in England.

A second lily very like *Duchartrei* is *L. papilliferum* Franchet discovered by Delavay in Yunnan amid rocks of Choui-a-ouan above Tapintze on August, 1888, at an altitude of 5,400 feet. Franchet says it is fairly close to *L. Duchartrei* but differs in narrower leaves, hairy papillae, and the intense crimson-maroon color of the flowers. The unusual character is a papillose stem, whence its name. Wilson thought it a charming lily and said the flowers are fragrant, solitary or racemose and that he found it in dry situations on ledges of cliffs and in open stony pastures at 10,000 feet which is higher than Delavay reported. Wilson says it is not as hardy as *L. Davidi*.

Delavay sent back three specimens of *L. lankongense* Franchet from Yunnan. He discovered the lily in the woods of Hee-chan-mem August 3, 1886, at an altitude of 10,000 feet and saw it again on the eastern slope of Lopin-chan at Lankong September 1, 1888, and a third time in the woods of Mo-so-yn of Koutouli July 17, 1889. Delavay described two of the specimens as "rougeatre." The amount of white along the margins of the perianth segments as well as depth of pink are said

to vary. Judging from the plate in the Elwes supplement, *L. lankongense* is a beautiful lily, pink with dark spots on the segments. The 2 feet high stem carries a racemose inflorescence of fragrant nodding, medium sized flowers with pointed segments. The lily has the stem clothed with leaves to the base thus differing from *L. Duchartrei* and *L. papilliferum*.

It seems a pity there is no species lily named for Delavay. For the lily Franchet called after him is now considered a variety of *L. Bakerianum*. Delavay sent home four specimens of this lily. The first he found June 20, 1888, and his field note on this specimen reads, "the flowers are vinous red, stems as usual, amid calcareous rocks above Lake Lankong." The other two he described as "fleurs roses" and "fleurs verdatres," so the color must be variable. This variety is not thought handsome but var. *aureum* supposed to be a mutation from the type, is said to be very beautiful. Franchet wrote "The flowers have the form of *L. candidum* but the divisions are less recurved and the color is red-brown recalling *Fritillaria meleagris* and the dark spots are disposed as in that plant."

Abbé Farges discovered *L. Fargesii* Franchet and *L. Davidi* var. *sutchuense*.

The territory where he was stationed from 1873-1903, and where he explored and found the lily was the mountains of Eastern Szechwan in the district of Cheng-Kow-Tin. Franchet thought the lily was pretty, close to *L. Davidi* with the same leaves but differing in its perianth, smooth outside and with little fringe-like scales extending parallelly to the nectar furrow and bordering both ridges of it.

By collecting many already known lilies the priests increased material

available for study and made known a wider distribution of the plants.

Several of the lilies they found are hardy and it is to be hoped they will soon appear in the borders along with the other beautiful plants from the mountains of China. Now thriving happily in our gardens.

CHINESE LILIES DISCOVERED BY FRENCH MISSIONARIES

Lilium Davidi, Abbé David, on borders of Szechwan and Moupin, July, 1869.

Lilium Duchartrei, Abbé David, Mt. Moupin, Thibet, July 1869.

Lilium cathayanum, Abbé David, Kuling, Kiangsi, 1868.

Lilium ochraceum, Abbé Delavay, N. W. Yunnan, August, 1887.

Lilium taliense, Abbé Delavay, N. of Lake Tali, Yunnan, July 24, 1889.

Lilium lankongense, Abbé Delavay, Lankong near Lake Tali, Yunnan, August 3, 1886.

Lilium myriophyllum, Abbé Delavay, Mo-so-yn, N.W. Yunnan, July 29, 1888.

Lilium papilliferum, Abbé Delavay, Choui a ouan, Tapin tze, Yunnan, August, 1888.

Lilium Bakerianum var. *Delavayi*, Abbé Delavay, Lake Lankong, Yunnan, July 20, 1888.

Lilium Fargesii, Abbé Farges, E. Szechwan, Cheng-kow-tin, undated, described, 1892.

Lilium Davidi var. *Sutchuense*, Abbé Farges, E. Szechwan, Cheng-kow-tin, undated, described, 1892.

LILIES FIRST THOUGHT TO BE DISCOVERIES AND PLACED UNDER HEADINGS LATER

Lilium pseudo-tigrinum, now *Davidi* var. *Willmottiae*, Abbé David.

Lilium mirabile, now *Giganteum* var. *yunnanense*, Abbé Farges, Abbé David, Abbé Delavay.

Lilium speciosum, now *Lilium speciosum* var. *gloriosoides* Baker, Abbé Farges, Abbé David.

Lilium formosanum, now *Lilium leucanthum* Baker, Abbé Farges.

PREVIOUSLY DISCOVERED LILIES
FOUND AGAIN BY THE FRENCH

Lilium giganteum Wall. Abbé Delavay.
Abbé David, grown at Vilmorin's.

Lilium speciosum Thunb. Abbé David.
Franchet says this specimen is the

only one of a wild plant in the Paris herbarium.

Lilium tenuifolium Fisch. now *Lilium pemulium* De Candolle, Abbé David.

Lilium tigrinum Ker Gawl. Abbé David, Abbé Farges (in E. Szechwan where it was cultivated to extract chlorophyll for medicine).

Lilium concolor var. *pulchellum*, Abbé David.

Lilium Brownii, Abbé David, grown at Vilmorin's.

Lilium cordifolium Thunb., Abbé David, grown at Vilmorin's.

Lilium Davidi, Abbé Farges, Orléans.

Lilium Davidi var. *Wilmottiae*, Abbé Farges.

Narcissus Notes

B. Y. MORRISON, Editor

By the time this reaches our readers, the daffodil season will have passed for some, will be at its peak for others and will be still to come for the rest of us. Whether it is, therefore, a matter of retrospect, of actuality or of promise it remains one of the most thrilling times of year. That this is so, is easily shown by the editor's correspondence, for an inquiry at almost any time of year will evoke an enthusiastic response. With the privilege of quoting having been granted, the following passages are chosen, one from the letters of the owner of a garden collection, the other an inspiring account of how one group of amateurs have started the narcissus fever in their town.

From Michigan writes Mr. Albert E. Greene: "I have a small collection of daffodils many of which I grow in my flower border in front of my hemer-

ocallis. This combination is very satisfactory for, by the time the daffodil leaves have died down, the day lily leaves cover the bare spots. Among the too many varieties that I have acquired, I particularly admire the following: Lord Wellington, *pallidus praecox*, Beersheba, Mrs. R. O. Backhouse, Dick Wellband, Lady Diana Manners, John Evelyn, Gertie Millar, Pearly Queen, Lady Hillingdon, Cheerfulness, Actea. I hope to get bulbs of a few of the newer varieties every year although there is always the problem of where to plant them.

"I first got the daffodil craze some forty years ago and I used to read the articles of the Rev. Joseph Jacob in *The Garden*, with great interest, but my garden at that time was on gravelly soil and the bulbs soon became too weak to bloom. * * * Six years ago I acquired a garden with a heavy clay

soil in which daffodils thrive. I have been planting my bulbs in a mixed border, particularly in front of hemerocallis but I fear that the location is not a good one for the bulbs. When I lifted some of them in early September, the basal plates showed signs of rotting, which, I suspect, is due to summer watering in the border. * * * Most daffodils seem to be of easy culture requiring little care and needing no winter protection except perhaps the poetaz varieties which are not hardy here. I plant my bulbs with the base about six inches below the surface and sprinkle them with a little leaf mold and farmer's fertilizer in the spring. I like to plant them early in September, to give time for root growth in the Fall."

From Kansas Mrs. W. B. Mills who has been instrumental, together with her friends in forming the Topeka Daffodil Club: "In 1933 I invited some friends to my home to organize a Daffodil Club. Today we are going strong and now have 110 members. We meet twice a year. In the Spring meeting we plan our annual daffodil show, which has been very successful. At the Fall meeting, our bulbs are distributed. Each member pays fifty cents a year. This money is used to buy bulbs at the hundred rate. Each member receives one of each kind, this year it happens to be five. We usually order a few extra bulbs to sell at a very small profit, which leaves us with a few cents to buy award cards or ribbons for our show." Mrs. Mills also sends the record of the varieties bought with a note of the increasing number of members. "1933, 38 members, buying 266 bulbs of Tresserve, Van Waveren's Giant, Nannie Nunn, Spring Glory, Gloria Mundi, Jonquilla simplex, odoratus campnello; 1934, 58 members, buying 406 bulbs, Bernardino, Early Surprise, Orange Cup, Cheerfulness, King Alfred, Sir Watkin, Hera; 1935,

58 members buying 406 bulbs of Diana Kasner, Croesus, Glory of Sassenheim, Red Chief, Evangeline, double campnello; 1936 with 52 members buying 345 bulbs of John Evelyn, Will Scarlett, Eagle, Hera, Golden Spur; 1937 with 43 members buying 251 bulbs of Alasnam, Silver Phoenix, Elvira, Bath's Flame, Queen of the North; 1938 with 41 members buying 263 bulbs of The Pearl, Silver Star, Olympia, Helios, Alcida; 1939, 42 members buying 411 bulbs of The First, Beppy, Nette O'Melveny, Franz Hals, Dante, Golden Beauty, Liberty; 1940, 45 members buying 479 bulbs of Aerolite, Stella Tidd Pratt, Sunrise, Lord Kitchener, Medusa; 1941, 48 members buying 432 bulbs of Red Cross, Tresserve, Twink, Mrs. Barclay, Klondyke, with extra sale bulbs of Cleopatra and Bernardino which raised the total sales to 725; 1942, 60 members buying 1,042 bulbs, Warwick, Alice Knights, Yellow Poppy, Abundance, Shackleton, Mae West; 1943, 70 members buying 435 bulbs of Gallipoli, Phyllida, Lucinius, Milford Haven, Early Perfection and Klondyke; 1944, 110 members buying 628 bulbs of King Alfred, Lovenest, Walter Hampden, Anna Croft and Conqueror, with extra bulbs bought for sale of Spring Glory, Orange Queen and *caniculatus*." Mrs. Mills writes further that this does not include all the bulbs bought by individual members aside from the club orders. "Up to last Autumn, the Club had bought about 6,875 bulbs."

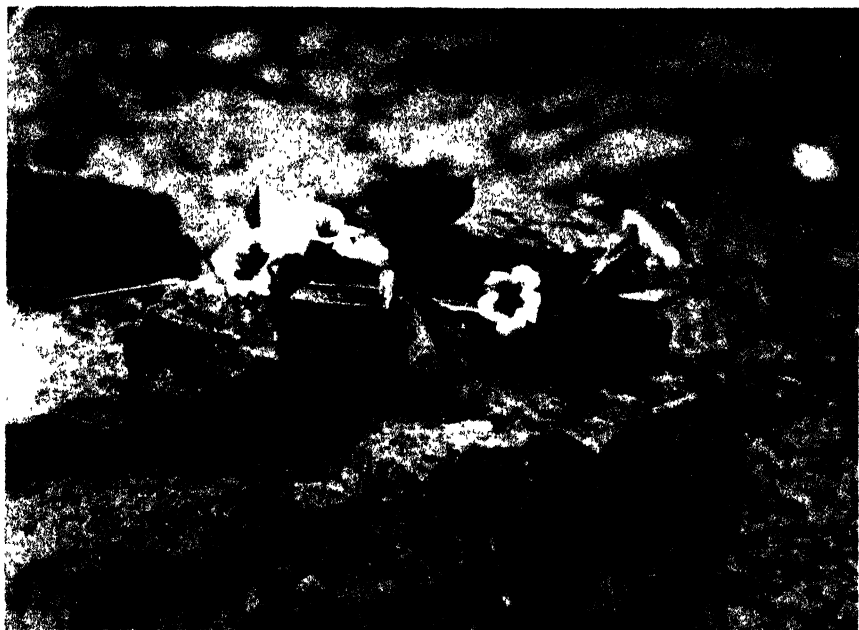
What sort of a difference would such a purchase as this make in your town?

As this is being written or copied in mid-February in lower Mississippi, Paper Whites have finished their precarious winter flowering which means always a race with the occasional freeze, but Soleil d'Or is in fine flower and two locally grown tazettas are in

good flower, the one a beautifully modelled bloom with white perianth and yellow cup, the other a somewhat wingy white perianthed thing with a lemon

cup. What other tazettas do you have or know? The editor would like to hear from Southern and Pacific Coast gardeners.

The Gardener's Pocketbook



Bignonia capreolata

Bignonia capreolata

This beautiful evergreen vine, according to Britton & Brown, in their *Flora of the Northeastern States*, is found growing wild from Florida to Ohio and southern Illinois. The writer first saw it in full bloom some years ago, on the edge of a wood in northern Tennessee, where it was climbing over trees and shrubs. We were immediately struck by the size and beauty of the flowers, with their lobes of a rich orange yellow color, and the tube of a paler yellow shade. The accompany-

ing photograph was taken after breaking off a sprig, and draping it on some rocks. Incidentally we dug up a young plant, and succeeded in establishing it here in southwestern Ohio, where it has grown up the trunk of a tree, and has attained a height of more than twenty feet. For some unaccountable reason, it has never put forth a single blossom. Possibly Bailey, in his "Encyclopedia of Horticulture," hints at the cause, when he mentions that the plant will only survive in Massachusetts as a creeping vine. This would

rather indicate that cold northern winters tend to inhibit bloom. It would be interesting to know, therefore, whether any reader has seen the plant in flower north of the Ohio river.

ROBERT M. SENIOR.

Neillia sincensis Oliver (See page 159)

The literature of this charming Chinese shrub had its rise in the late 1800s but its press, at best, is scanty and scattered as befits a plant of secondary importance, if one measures it against such opulent charmers as lilacs or even its nearer relative the spirea.

As far as we North Americans are concerned its nearest native relative is *Physocarpus* of which as Mottet says, speaking of *Physocarpus opulifolius*, in his article published in *Revue Horticole* (1919), "the most generally cultivated and often in its form with golden leaves."

More nearly related and more commonly cultivated is its other near relative, *Stephenandra* particularly its species, *flexuosa*.

As yet the Chinese *Neillia* has not settled down to completely familiar living at the base of the hillside where it has a spot in morning shade and afternoon sunshine, the sort of spot that one may safely choose when the tastes of the subject are not completely known. Here it is beginning to show signs of making a loose thicket, a useful bit of knowledge for the gardener even if the taxonomist passes it by.

According to Mottet (l.c.), it is native to western Hupeh in China and was introduced in cultivation by Wilson in 1901.

The illustration shows the leaves and flowers natural size and suggests as well, the twiggy character of the overarching branches. The picture was taken looking down on the branch, but the profile can easily be imagined.

The flowers when first seen brought

vividly to mind the beautiful shrub which the writer knew as wild currant in California (*Jamesia* sp) although the color of *Neillia*'s blooms is paler, more a pink-tinted white deepest on the reverse and in the bud state. It was interesting, therefore, to see that Mottet wrote, "thanks to the rose color of its racemes of flowers which resemble a little those of the red currant" and to note that there is another species, *N. ribesioides* whose name commemorates its likeness to the flowering currants.

Forced to an issue one might not care to give up any one of a number of flowering shrubs that cover themselves more lavishly with spring bloom, but where there is ample space, this is well worth the trouble and cut sprays of *Neillia* flowers always attract attention. Near Washington, D. C., it flowers in mid-May, just before weigelas and kolkwitzia with which it could not compete.

The Queen Palm—Arecastrum Romanzoffianum

Throughout the central part of the State of Florida, one of the most widely used palms for planting in avenues and on lawns as solitary specimens is the Queen Palm, *Arecastrum Romanzoffianum*. Here in southern Florida, its place is for the most part taken over by such tropical species as *Roystonia regia*, *Cocos nucifera*, and *Eupritchardia pacifica*. Only occasionally is *Arecastrum* seen in the vicinity of Miami, but when it is grown here it forms a tall and magnificent palm in a very few years.

The Queen Palm was originally described by Chamisso in 1832 as *Cocos Romanzoffiana*, his specimens having been collected in 1815 on the island of Santa Catarina, off the coast of southern Brazil. In 1860 Hooker described and illustrated this plant under the name of *Cocos plumosa*, the one by which it



R. L. Taylor

Neillia sinensis

Natural Size

is most widely known today, however erroneous it may be. The great Italian palm specialist, Odoardo Beccari, when he revised the genus *Cocos*, created a new genus for the Queen Palm, naming it *Arecastrum*, which means *Areca*-like. This nomen was given in reference to the similarity of the arrangement of the flowers on the inflorescence

by several vernacular names, among them being "gerivá," "côco babão," "côco de cachorro," and "côco de boi." The species is widely grown in Florida and southern California, in the former state being particularly utilized as an avenue tree. It is a very rapid-growing palm, forming an imposing specimen in only a few years when cultivated under suitable conditions.

The Queen Palm eventually will attain a height of about forty feet, with numerous long, beautifully arching leaves many feet in length. The leaf-pinnæ are suddenly bent downward near the middle and give the palm a most pleasing and graceful appearance. From among the old leaf-bases appear the great woody spathes, often four feet for more in length. They



The Queen Palm. Washingtonia and Phoenix in background

branches to that of the paleotropical genus *Areca*.

Arecastrum Romanzoffianum is a native of a large area in South America, ranging from the southern part of the state of Bahia in north-central Brazil, throughout the central and southern parts of that great nation, all of Paraguay and Uruguay, and much of northern Argentina. In Brazil it is known



The Queen Palm, trunk leaf bases and immature fruit cluster

soon split, liberating the great pendent mass of yellow flowers, which are greatly enjoyed by the bees and wasps. The fruit is usually produced in great abundance and becomes orange-yellow when ripe. It is edible, but has a rather peculiar flavor, a not too enjoyable one.

There are several varieties of *Arecastrum Romanzoffianum* generally admitted, only one of which apparently is cultivated in this country. Var. *australe* has smaller and narrower fruits than the typical species, and is said to be a more slender tree.

The accompanying photographs were taken at the Fairchild Tropical Garden, Coconut Grove, Florida, where some very good examples of this beautiful palm are to be found.

Strelitzia Augusta

Although its small sister species, *Strelitzia Reginae*, is widely cultivated for use as an exotic cut flower, *S. Augusta* is very uncommon in this country. Probably the main reasons for this rarity are that the plant is fairly tropical in its requirements, and that it grows much larger than *S. Reginae*, thus not being so easily grown in such a limited space as that afforded by most greenhouses.

The genus *Strelitzia* is one of a very few placed in the Musaceae, the Banana Family. It consists of about a dozen or so species, natives of South and Central Africa, of mostly rather tall, frequently woody plants with banana-like leaves and showy white, blue or green flowers borne in one or more boat-shaped bracts. *S. Augusta* was first described in 1781 by Thunberg from material collected in South Africa. It is very closely allied to *Strelitzia Nicolai*, another South African species, which it greatly resembles both in habit and foliage, but it has smaller flowers



Strelitzia Augusta with inflorescence at right center and an old flower cluster at left center

borne in a spathe not reaching the dimensions of the other species, and the petals are all white, instead of a couple of blue ones, as those of *S. Nicolai*.

Strelitzia Augusta eventually attains a height of about twenty feet. At that time, it has an erect or leaning, woody trunk marked by the scars of the old-leaf bases, and a large fan of leaves at the apex. These leaves have thick petioles from three to six feet long, and the leaf-blades are usually about as long. They are oblong and acute in shape, and soon become split and torn transversely by the wind, much in the way of banana leaves.

The flower-spates are borne from the axils of the leaves, on a short thick peduncle. They are boat-shaped,



Warren C. Wilson

Trillium sessile: Stemless-flowered Wake-robin

usually two in number, one above the other, become hard and woody with age, and are usually about a foot long. Generally they are of a deep purple color, and they have a sharp point at the apex. The flowers open singly or occasionally in pairs and are pure sparkling white.

In the illustration may be seen a group of three spathes, the upper pair being turned toward the back of the scene. A fresh flower is evident in the lowermost spathe, and a faded one just behind it. At the left of the leaf-fan is an old inflorescence, with the now woody spathes and the parchment-like withered flowers.

ALEX D. HAWKES,
Coconut Grove 33, Fla.

A Curious Wake-Robin

Most of you have seen in the Suring the lovely White and Painted

Trilliums and smelled (just once!) the ill-scented Red Wake-robin. The Stemless-flowered Wake-robin, *Trillium sessile*, as its awkward name suggests, is unusual. The more common and showy species, at least in the northeastern section of the country, bear their flowers above the leaves on slender stems. *T. sessile* is entirely stemless.

This *Trillium* has a stunted, ungraceful appearance that sets it apart from its northern relatives. Even the flowers give it no distinction; they are muddy purplish red or sometimes greenish. They do not have an offensive odor, if my memory serves me, but they look as if they well might. What, then, are its attributes?

The Stemless-flowered *Trillium* is rather uncommon in the East. It grows in rich, moist woods and bottomlands from western New York to Mississippi and southward to Florida. There are



Warren C. Wilson

Cystopteris montana: Mountain Bladder Fern

a few other species similar in appearance in the southern part of its range. In the north it is always an interesting "find" on a nature walk. This species is a good example of the derivation of its generic name, *Trillium*, from the Latin *tres*, three. The leaves, sepals and petals are in threes. In the wild-flower garden it usually arouses the curiosity of persons familiar with the more abundant trilliums.

WARREN C. WILSON.

The Mountain Bladder Fern

Finding the Mountain Bladder Fern was an accident. I had stopped to adjust my knapsack straps and noticed a fern new to me at my feet. On two previous trips I had long but unsuccessfully searched for this species. After passing this particular colony five times on my way to and from Mt. Albert in the wilds of the Gaspé Penin-

sula, Quebec, I finally recognized this rare fern.

Cystopteris montana is its very descriptive scientific name. From the Greek comes *kystis*, bladder, and *pteris*, fern. This refers to the inflated cover over the tiny fruiting bodies on the underside of the fronds. *Montana*, from the Latin, means "of the mountains."

This little fern is rare in the Gaspé region but is more common northward from Labrador to Alaska. It occurs locally south to the north shore of Lake Superior and Colorado and is also found in northern Europe and Asia. The Mountain Bladder Fern frequently grows in a rocky, organic soil on the wooded banks of mountain streams. In some sections it inhabits rock ledges at high elevations. The rather triangular, finely cut fronds, some ten inches in height, distinguish

it from the other two species of Bladder Ferns. It might readily be confused at first glance with the Oak Fern, its companion in some areas.

WARREN C. WILSON.

From the Midwest Horticultural Society

Bittersweet

The native American bittersweet (*Celastrus scandens*) is a plant that is universally admired when seen in the fruiting stage. One of the familiar roadside scenes is the festoons of bunches of the orange and red fruits, being vended from fruit stands, filling stations, farm houses, and stores in the fall. That the plant is rather easily grown and a reliable bloomer even in fairly poor soils is not realized.

The plant is a twiner and should be grown on support in much the same manner as Wistaria. The perennial woody stems spread out and cover quite an extensive area. The foliage is attractive and the fresh twining stems growing among the older ones are ornamental. The great beauty of the plant is in the fall when the fruits turn color and split to expose the inner portion. The combination of red and orange is striking. These fruits remain on the vine for a long period and if seen in the barren fall and winter are much more attractive than the dried ones inside. A good sized vine should produce several branches for inside decoration and still retain many for the outside effect.

While a few years may be needed to grow the vine to fruiting size the permanence of it more than repays the initial wait. For naturalizing it may be underplanted among small trees or just planted in the open and allowed to intertwine. A little planning will probably disclose many places where this can be planted and which will furnish many fruits for winter decoration

as well as an attractive vine for summer.

Malus ioensis Bechtel's

While there is much interest in the crabapples as ornamentals most of the emphasis has been placed on the oriental species and their derivatives. The native crabs in the wild are fully as beautiful in flower as most of these exotics. However, being wild and rather common they are admired only as seen in the spring landscape. Some landscape men, notably Jens Jensen, have stressed the value of these species in ornamental plantings. The only variety that has so far achieved widespread fame is the double form which originated as a sport near Staunton, Illinois sometime around 1840. This was propagated by E. A. Bechtel and introduced to the trade around 1888. Thus having been in commerce for more than fifty years it has become well disseminated.

In general appearance the variety differs little from the species. It has the same growth habits, same foliage, and same indifference to soil and exposure. The great difference is in the flowers which are quite double and several weeks later than the species. The double blooms appear after the foliage is nearly mature and unless as well as the single ones which appear while the leaves are still small. Bechtel's crab does have the trait of being a profuse bloomer when the tree is established. As in many fruits the time of maturity for the tree would vary with the site. A rich soil delaying full flowering until the tree is larger and older. A mature Bechtel's in full bloom is one of the most beautiful small trees for this region.

White Fir (Abies concolor)

Among the evergreens commonly used in this region the genus *Abies* is

seldom seen. Why this genus has been so overlooked is rather puzzling as the balsam fir is native but a short distance north and is the most popular of the yuletide trees. Probably lack of the native material and bad experiences with collected stock has limited the interest. The white fir which is a native of the Rocky Mountain area at first glance does not show some of the conspicuous characters of its relative. The aromatic resin is lacking, the needles are long and rather limber instead of short and compact, the color is a blue green rather than a dark green.

The white fir is listed as being hardy over most of the country. Here it is hardy and will succeed on a variety of soils. While said to be able to withstand hot weather it probably will benefit by being partially shaded especially from the noon sun in summer. The plant grows quite conical and should be used as a specimen where a large plant can be used.

According to the literature there are some rather silvery forms of this but so far most of the ones in this region do not have any noticeable tendency in this direction.

Silver Lace Vine (Polygonum Auberti)

The Silver Lace vine is an herbaceous vine that is excellent for covering pergollas, arbors, garages, or for screening good sized objects.

Once established the shoots of the plant grow with rapidity in the spring and may reach a height of twenty feet. On low support the stems droop over. As the stems are twining they need some open work so that they can have support. Wires, twine, or ornamental open woodwork are satisfactory.

As this is a *Polygonum* the resemblance to some of the native ones can be discerned as well as the relationship to some of the coarse exotics. The soil

should be a good loam not heavily fertilized as the presence of too much food may cause an undue growth of foliage and dearth of flowers.

The flowers are white and produced in small drooping clusters. These small flowers when seen from a short distance have a lacy appearance which accounts for the common name. The clusters bloom for a long period and, of course, the older flowers keep fading and dropping. This would mean that a walk directly under the vine would need frequent sweeping to preserve a tidy appearance.

This is probably too robust a vine for the small garden except as a background or screen plant.

ELDRED E. GREFNE.

Annuals

Although there may be some who will object to the idea of too much space given over to annuals, the fact remains that many of the plants in this category give a very large return for the effort expended. They are also particularly welcome in areas where summer heat is trying to more permanent material but which is quite to their liking. This is not true of all annuals and no one should imagine them a panacea for summer trials.

In the years that have gone by, the Magazine has not devoted much room to annuals, believing that each person would find them out as he or she cared to, but from now on, there will be more space given over to this class of plant.

Only a few of our reader-members have given any suggestion that they would like to participate in trials, so the idea has been abandoned. The editor, however, and a few members are risking the effort of gathering materials, both in notes on pictures from which eventually magazine notes and perhaps, a yearbook will be evolved. Any one who will is cordially invited to write

to us, of their particular interests, failures and successes. A wide geographical reporting would be most welcome, since dates of sowing and span of usefulness are almost never the same.

In looking through seed catalogues one is struck with the modern tendency to reduce the old-fashioned list to relatively few genera and to present these in a wide range of forms, colors and seasonal uses. One is struck also with the developments that are going on among composites. No one thinks any more with surprise of the variety of forms that one finds in the dahlia, the moderate number of variations that occur in sunflowers, the infinite variety that appears in chrysanthemum, but one is impressed with the changes that are overtaking the zinnia and the marigold, changes which are producing a variety of forms already more familiar in the chrysanthemum, alterations in the form, shape and carriage of the ray florets, strange developments in the character of the disk florets.

In the marigold, it is interesting also to notice the progress achieved in bringing into the so-called African types the colors and hues which until lately have been the exclusive property of the so-called French marigolds. When the time comes that we shall have strains with the size of the pres-

ent day African forms in the rich colorings that remind one of wall flowers as well as of dwarf marigolds, there will be added pleasures to the many already to be had from a few packets of seed that cost so little.

It would be interesting also to learn from member gardeners how many annuals they can and do grow as winter annuals, some in autumn for early flowering. In a recent February visit to Mississippi, a garden showed the first flowering of the beautiful California annual, *Nemophila insignis*, with white-eyed clear lavender blue flowers as lovely as the spring bulbs in the North. They made a strip of color on the border edge that will be replaced in summer by the pansy colored *Torenia* which self-sows in that milder clime.

Who, in time, will turn a calculating eye on the four-o'clock? This is now an escape in many parts of the South, not too well thought of with its perennial fleshy roots that make it a permanent feature of some gardens. Who will try to sort out and keep sorted out and fixed the color forms of portulaca? There was a time when one could have seed of these.

And who will decide which may be the annuals that the American public can be persuaded, cajoled into buying largely? The seed dealer or ourselves?

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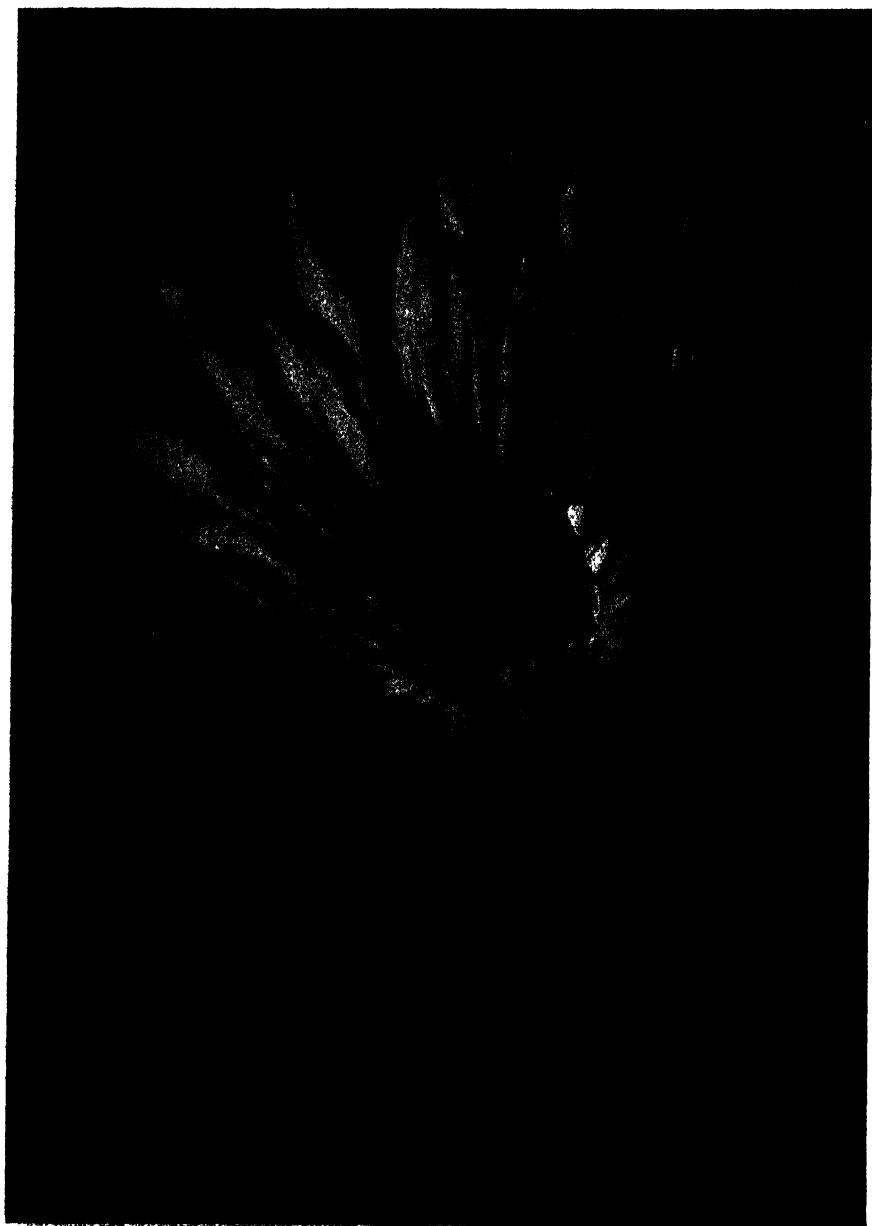
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Robert L. Taylor

[See page 245]

Nymphaea, Peachblow

Rambling Along the Delphinium Path

LEON H. LEONIAN

The literature on delphinium seems to be full of contradictions, and the average gardener becomes confused, discouraged, and decides to try some other flower easier to grow. As a matter of fact, however, the contradictions are not real; they merely represent the experiences of the individual author. Such experiences are gained under different environmental conditions, and since delphinium culture is greatly modified by the environment, it is no wonder that what may be the ideal condition under one set of environment, may easily become the least desirable under another. Thus, while in warmer regions the ideal location for delphiniums is a northern exposure and afternoon shade, full sun all day long, and therefore, a southern or eastern exposure is the best in cooler climates. The prospective delphinium grower should scan the literature more critically and follow the recommendations of the person who lives under conditions similar to his own. Then he will have no false impressions and no bitter disappointments. When Watkins Samuel developed his strain with flowering spikes five feet or more in length, it became the ambition of everyone to grow such giants in his garden. I know of one grower in Canada who purchased a number of named varieties from Mr. Samuel and hopefully watched for those long spikes to develop under Canadian conditions. The longest spikes that he ever got measured less than two feet. Even in England, only a few miles from Wrexham, the varieties regularly throwing up five foot spikes rarely grew to be three feet. In Mr. Samuel's garden, I understand, the soil is so deep and loose that one

can push a walking stick all the way down without exerting much force. A deep, rich soil, cool climate, abundant moisture and good cultivation bring out all the good qualities of delphinium. But how many people can boast of such conditions? Such being the case, one should expect from delphiniums no more than one's environment will allow.

The color of the flowers is also subject to modifications under different environments. This applies particularly to the blue shades. If the season happens to be cool, pure blues without a trace of any other shade come to gladden the heart of the gardener; but if the season is warm, the blue becomes contaminated with hues of lavender.

Pests and diseases of delphinium are also greatly modified by the environment. The cyclamen mite, for instance, is most active during cool seasons, and rarely shows much effect when it is unusually warm. Mildew is not a factor in warm, dry climates, but where it is cool and the atmosphere moist, it becomes a serious menace. High altitudes and cool climates check crown rot, the most dreaded disease of delphinium; in warmer climates these rots play havoc with delphinium.

The foregoing suffices to show the importance of environment on delphiniums. Once the would-be grower of delphiniums appreciates this, it will not be difficult for him to modify his cultural practices according to his climatic and soil conditions and thus achieve at least a fair amount of success. Since in this country delphiniums are propagated largely by means of seeds, let us begin with seeds and end with them. It will not be possible to go into great

detail, but we will hit the high points and outline a working program.

Delphinium seeds lose their viability unless they are kept in tightly stoppered vials and placed in the refrigerator. Not being well insulated like many other seeds, they rapidly give off their precious moisture and loss of vitality follows. This important factor should be kept in mind when the seed is sown. If, during the first two weeks, the surface soil is allowed to dry for even a short time, the seeds perish and no seedlings will show up. On the other hand, if there is too much moisture in the soil, again there will be no or few seedlings because an overabundance of moisture means oxygen shortage and a subsequent failure. If covered too deeply, delphinium seeds will not form seedlings because they will be unable to push their way up through the soil crust. This explains many a complaint made by the purchaser. "Seeds harvested from my own plants came up very well; not one of your seeds came up." Chances are that he used forceps and carefully spaced the seeds for which he paid a high price, whereas his own seeds were sown thickly and without too much fuss. The combined force of crowded seeds sufficed to push the crust up, whereas singly placed seeds suffocated for lack of force to push their way up. However the situation is not always as simple as this, and many other factors come in to complicate matters. For instance, a gardener sows his seeds in August and failing to obtain a good germination complains to the seedsman. He receives replacements and this time he gleefully reports a 100 per cent germination. He received the same kind of seed, from the same container; why did he fail the first time and succeed the second time? Blame it on the weather: early in August it is usually too warm in many parts of our country, and del-

phiniums do not germinate well when the temperature is too high and, in addition there is little or no rainfall. By the time the customer receives his replacement it is September; the days are cooler and the rains more abundant. The delphinium-wise customer waits until the arrival of cooler weather. If it is too late for fall sowing, he waits until early spring. But what are we going to do with the customer who reports as follows: "Seeds purchased from X came up 100 per cent, while yours failed to come up at all." And in the same mail there will be a letter to the effect that "your seeds came up 100 per cent, those of X failed to give a single seedling." In such a case all one can do is to grin and bear it. The environmental conditions vary so much not only in different parts of the gardens but even in different parts of the same seedbed that it is impossible to make an intelligent analysis.

But what of the seedbed? Here again we are dealing with a physical and chemical environment that is going to determine the success or the failure of seedling production. If the soil is too acid, there will be no seedlings; if it is too alkaline, there may be seedlings but they will develop chlorosis and perish. I prefer a neutral or a slightly acid soil. The texture of the soil should be loose to provide water and air drainage. Sand, coal ashes, peat moss, and sphagnum moss are very good substances to lighten the soil. Woods' dirt should be avoided because it contains substances harmful to delphinium. Sawdust, manure, and domestic peat moss come under the same category, at least under some conditions, and therefore it is safe to avoid them. Soil taken from under the sod is the best, because it is less likely to carry harmful substances, or micro-organisms which attack delphinium.

During the early phases of germination and up to the appearance of the first true leaves the danger from damping-off organisms is very acute especially in case of indoor sowing. There are many ways of avoiding this, good, bad, or indifferent. Heat sterilization should be avoided because heated soil liberates elements that are toxic to delphinium seedlings. Formalin treatment of the soil is effective but requires a certain amount of skill, otherwise more harm than good ensues. Sphagnum moss, rubbed through a sifter, furnishes the ideal medium in which to grow delphinium as well as many other seedlings. If one does not intend to transplant the seedlings as soon as the first true leaves appear, he may use only about two inches of sphagnum moss on top of the soil; otherwise pure sphagnum moss will do very well. If allowed to go dry, sphagnum moss forms a crust through which water does not penetrate very readily. Therefore care should be taken to keep it moist but not soggy.

It is advisable to keep the flats or the cold frame protected against rain. Heavy rains beat the seedlings down and make them easy prey to certain soil-inhabiting fungi. Continuous rains encourage such fungi, and what promised to be an excellent stand of seedlings ends up with no seedlings at all. Many gardeners have suffered such losses but few know why.

Seedlings resulting from fall-sown seeds should be provided with some protection against winter. The cold frame, or the flat in which seedlings are grown should be covered with wire-screen to keep out insects and animals; mulching material may then be added.

Transplanting should be done as early in the spring as possible. It is best to transplant the seedlings into paper or wooden bands, allow them to establish themselves, and then set them

out, band and all. Where seasons are long, this may be done in the fall. Late transplanting and the use of bare-root seedlings cause much loss because often there may be a dry period in the spring, or an unseasonable period of high temperature. Any seedling that is not well established may be lost.

Lime or fertilizer should not be used at the time of transplanting. It should be delayed until after the seedlings are well established; or it should have been done the previous fall.

Usually the best display is made the second year. In regions where delphiniums continue to grow all winter, the first year seedlings attain the maximum beauty. Under sub-tropical conditions delphiniums bloom once and then die. Where seasons are short, delphiniums bloom once a year but continue to live and to thrive year after year.

There has been much agitation about developing delphiniums that will require no staking. Where high winds, and particularly wind-driven hard rains are not known during the delphinium blooming time, one may expect to have delphiniums to stand up with a minimum of protection; otherwise staking is essential no matter how tough the spikes may be. A 3-foot flowering spike is pretty heavy; when loaded with rain, it becomes still heavier; but when rain and wind join their forces, no spike in full bloom can withstand the pressure. Bamboo canes afford excellent protection; one cane should be used for each spike.

There seems to be a general impression that delphinium flowers are pollinized by insects, especially by the bumble bee. This is not true. In the greenhouse, where there are no bees, delphiniums produce an abundance of seeds. Emasculated flowers outdoors, exposed to the visit of bees, moths, and humming birds, rarely, if ever, set seeds. The anthers mature one by

one, or two by two, never all together. First they become erect and thus touch the inner surface of the curving petal (eye). The discharged pollen sticks to the inner surface of the petal and the old anthers wither away to make room for the others. By the time most of the pollen has been discharged, the stigma pushes its way up and by coming in contact with the pollen-laden surface of the petal is automatically pollinated.

Since delphinium is self-pollinated, it follows that unless cross-pollination is used, propagation by means of seeds will not give the desired results. Flower lovers are advised to purchase only such seeds that result from cross-pollination by hand. It is true that such seeds are, of necessity, higher priced, but it is equally true that scrubs or aristocrats require the same amount of space in the garden, and the same kind of care. Why not have the best?



Lycoris squamigera (see page 242)

Bamboos for American Horticulture (I)

ROBERT A. YOUNG

The economic possibilities of bamboo on an agricultural crop basis in the South have been dealt with both broadly and in some detail by Mr. E. A. McIlhenny in his own excellent articles in the January and April numbers of this magazine. In the following pages and, it is hoped, in later issues, I shall attempt to indicate something of what may be done further with bamboos in horticulture. Only a beginning has been made in the possible utilization of bamboos in the horticulture of the continental United States and in our nearer islands, Puerto Rico and Hawaii. This is accounted for largely by the very small number and limited distribution of indigenous bamboos and the complete absence among them of species adapted to horticultural uses; there are no native bamboos in Hawaii, and only a few unimportant ones in Puerto Rico. (*Bambusa vulgaris*, introduced rather early into Puerto Rico, is established in many localities at low altitude, especially along water courses.)

Other reasons why we of the mainland have not more quickly and generally taken to bamboo growing for decorative purposes (and for the edible young shoots) are suggested by the striking differences in habit of growth and in appearance between bamboos in general and any of our commonly grown horticultural plants except some of the larger grasses. There are also the limitations on successful culture, in many of the more northern or inland areas, imposed by susceptibility of the plants to serious injury from occasional sub-zero temperatures in winter. Without these periodic and destructive "lows" the

plants would thrive continuously over a larger area.

The bamboos, as is well known, are woody-stemmed perennial plants belonging to the grass family. Gramineae, subfamily Bambusoideae. They are rather sharply distinguished from other grasses in having their leaves with a well-defined petiole and in bearing their leaves on branches instead of directly on the culm—except the tip of the culm, which functions as a branch and does bear leaves. Below these leaves gathered at or near the tip of the culm, the "leaves" become culm sheaths, the blades of which, in descending order, are gradually reduced in size and character until they cease to function even temporarily as true leaves. In many bamboos, and especially the larger species, the culm sheaths are early deciduous, but in several groups of hardy species, these sheaths are more or less persistent.

More than fifty genera of bamboos are recognized and the total number of described species and varieties throughout the world is probably near 1,000 at this time. More species, particularly from China but also from tropical America and other regions of the world, are being described every year. Flowering is exceedingly variable among the bamboos. In a few species it may occur at intervals of only a few years and without resulting death of the plants—unless seed production is profuse, which often it is not. The period from seedling stage to flowering is recorded for relatively few species but is known in some instances to be at least fifty to sixty years. In cultivation, therefore, propagation is effected solely by division of

the plant or of one of its parts—culms or rhizomes.

As was indicated in Mr. McIlhenny's article in the January number, there are two general types of bamboos, "clump" and "running"—terms indicating the manner of growth and the rate of spread of the plants. In the first type an underground stem, or rhizome, grows from the base of a culm (vertical stem, or cane) and, with little or no horizontal growth, turns upward to form another culm. From the base of this new culm another rhizome soon starts, likewise turning upward, and so on indefinitely until flowering or some other fatal event occurs. This gives the more or less dense arrangement of the culms characteristic of the clump type. In allusion to the mode of rhizome and culm development, bamboos of this type are said to be of "sympodial" habit. The second, or running, type has rhizomes that in general run horizontally underground for a considerable distance and either never or only rarely turn upward at the tip. They give rise to culms from lateral buds at certain of the nodes, thus forming gradually—sometimes rather rapidly—an extended thicket. The terminal bud of a running rhizome may die after a certain length or age is reached, and when it does a branch rhizome grows from each one or more lateral buds immediately behind the tip. Such a case is shown on an adjoining page. In reference to this second mode of rhizome development the running, or spreading rhizomes are said to be of "monopodial" habit.

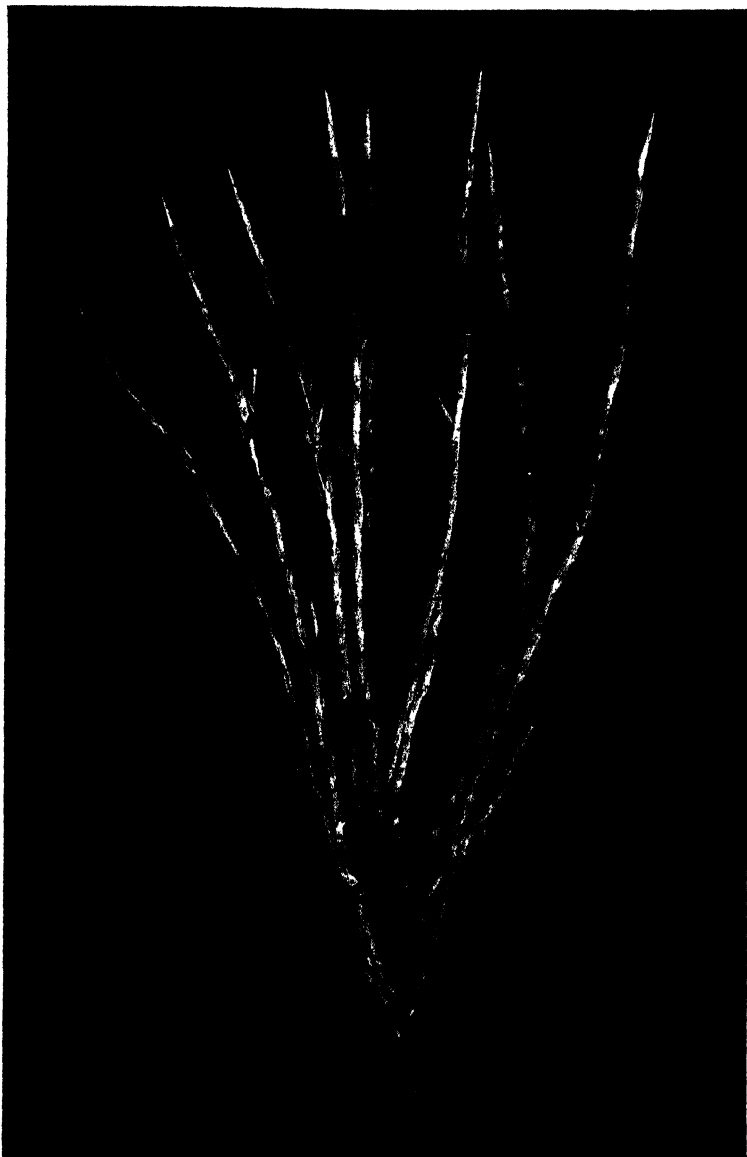
In some of the groups of bamboos with monopodial rhizomes the mode of development is intermediate between the types described, and in certain of these the two types are combined in the same plant. An example of the latter is found in our southern

switchcane, *Arundinaria tecta*, and is illustrated on another page. Bamboo rhizomes are all jointed, consisting of nodes and internodes, much like the culms but with internodes shorter and much thicker walled—sometimes nearly solid. The true roots develop in a whorl from each node of a rhizome and of the culm base.

It will be the purpose of this series of papers to illustrate and briefly describe some of the more important or well-known bamboos of different sizes and habits of growth at present cultivated in the United States.

THE HARDY RUNNING BAMBOOS

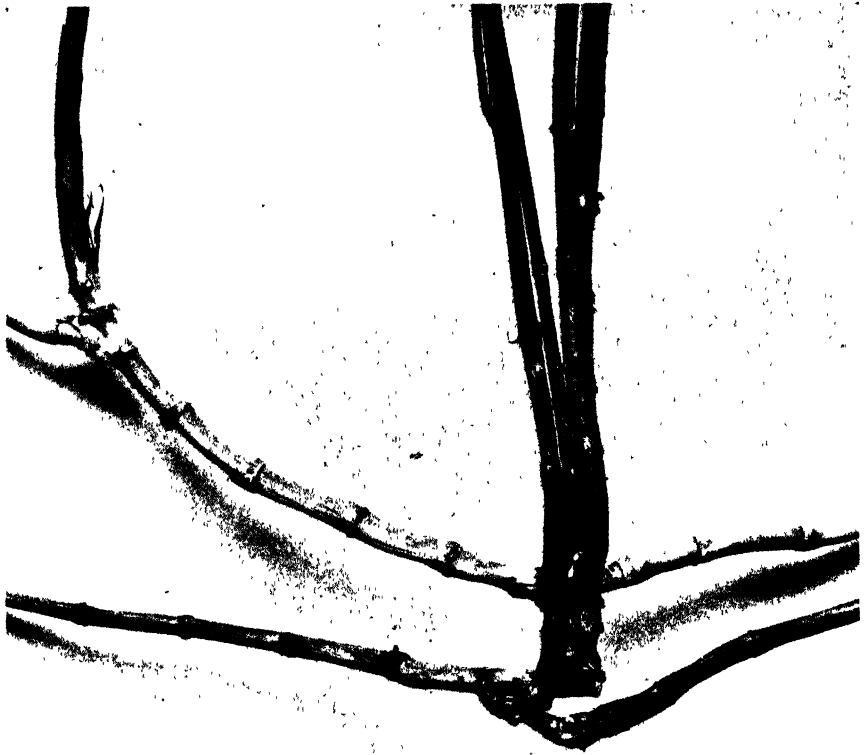
The distinctly hardy bamboos, with which we shall first be concerned, are mostly evergreen at temperatures down to 5° Fahr. or a little lower, but at about zero the leaves of even the hardiest are killed, and at a few degrees lower the stems are partially or completely killed. It is perhaps of interest to mention here that the leaves of all the distinctly hardy bamboos—those of the temperate zone—have conspicuous lattice-work, or tessellated, venation, which is easily visible under an ordinary hand lens. The culms normally live for several years and when all are killed, by cold or other means, the size of those produced in the succeeding season will be much smaller. The hardy bamboos send up their new shoots in the early weeks of really warm weather in spring, provided the ground is reasonably moist. A shoot develops into a culm of full size in about six weeks, though the wood is at first very soft and only attains its maximum density and strength gradually during the first three years of its life. During the period of elongation the culms are very delicate at the nodes and only by the support of the tough, tightly encasing sheaths are they enabled to withstand the lateral stresses caused by ordinary winds.



Branching Rhizome of a Running Bamboo of the Genus Phyllostachys. The nine branches in view grew from lateral buds at nodes of the rhizome (underground stem) immediately back of the terminal bud when the bud died. (See page 172.)

These hardier bamboos are mostly native to China and Japan. At least two species, however, of the very wide-

spread and diverse genus *Arundinaria* are endemic in our southern states, and there are others in certain parts of



Rhizomes and lower sections of culms of the Switchcane, Arundinaria tecta, showing clump development of culms in conjunction with running rhizomes. (See page 172.)

tropical America, tropical Africa, and the mountains of southeastern Asia.

Other genera of hardy bamboos besides *Arundinaria* of which representative species are now in cultivation in the United States are *Phyllostachys*, *Pseudosasa*, *Sasa*, *Semiarundinaria* and *Shibataea*. However, with the exception of *Phyllostachys*, generic lines in this large group are not too clearly drawn, and for this and other reason there has been and doubtless will be further considerable transfer of species by botanists from one genus to another. The final status and the correct names of some of the bamboos to be

discussed are therefore uncertain. In these cases synonyms will be given, which should help to prevent possible misunderstanding as to the identities of any of the plants being considered. The genus *Pleiblastus*, erected in 1925, is at present considered by some authorities to be of doubtful validity and in this paper it is recognized only in synonymy. Of the several hundred species and varieties of hardy bamboos already described, the greater number grow only a few feet high and relatively few of these possess qualities likely to give them much economic or ornamental value, especially in the United

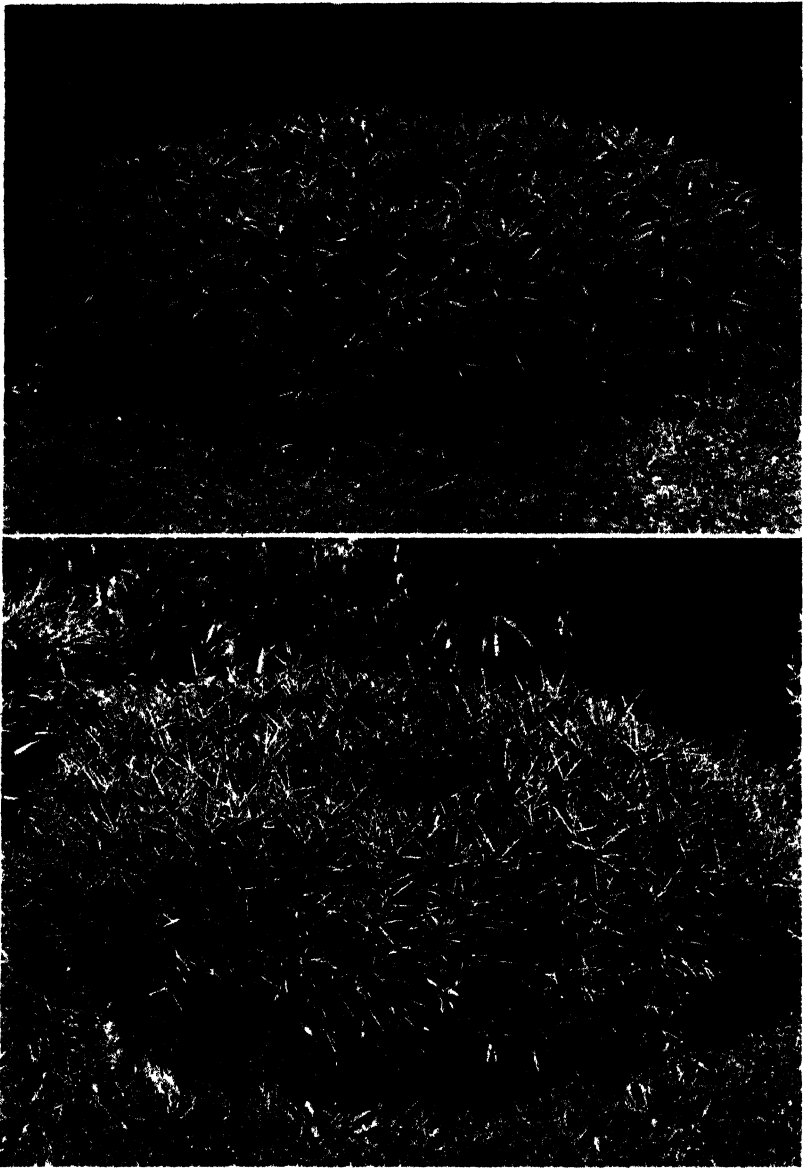


A group of six species of running bamboos grown in "clumps," with roots confined, at U. S. Plant Introduction Garden, Glenn Dale, Maryland. Foreground: *Arundinaria graminea*. Center: *Sasa chrysantha* (left); *S. pumila* (right). Background: *Pseudosasa japonica* (left); *Phyllostachys nigra* var. *henonis* (center); *Shibataea kumasaca* (right).

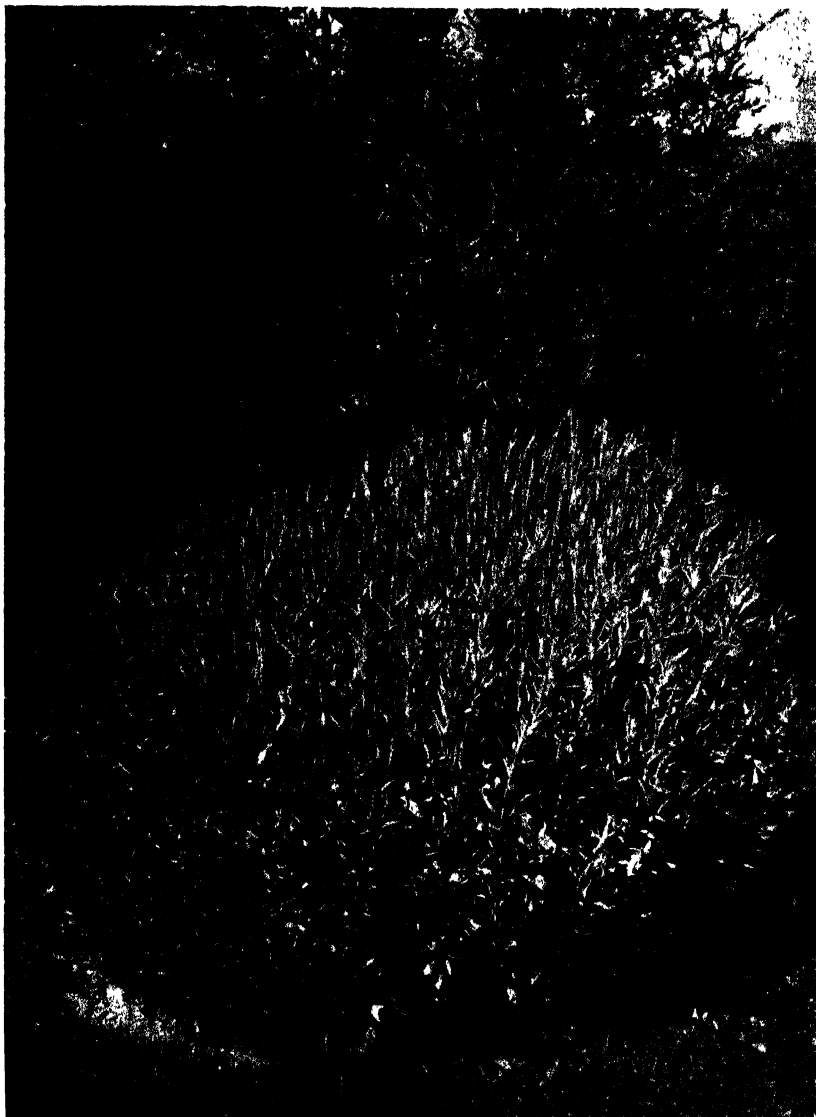
States. In the present article attention will be given almost entirely to the hardy bamboos—mostly rather small—of the genera mentioned above other than *Phyllostachys*. They will be treated, as far as practicable, in order of size, the smaller being considered first.

The photograph on this page shows a small part of a collection of hardy

oriental bamboos, grown in circular "tanks" 5 feet in diameter—filled with soil and without bottoms — at the United States Plant Introduction Garden, Glenn Dale, Maryland. The tanks are for the purpose of keeping the running rhizomes from spreading into adjacent areas. They are formed from galvanized iron sheets 26 inches wide



Sasa pumila, a dwarf running bamboo, with roots confined. Above: with leaves normally expanded; below: with leaves curled, or rolled, inward from heat of direct sunlight. (Plants 26-28 inches high.)



Shibataea kumasaca, a unique broad-leaved bamboo—roots confined—with ovate-lanceolate leaves. The new culms, with leaves not yet fully expanded, dominate the center and right side of the clump.

and are sunk that distance into the ground. Running bamboos with their rhizomes thus confined grow in an artificial clump form and should be clear-

ly distinguished from those that grow naturally in compact clumps. These plantings were about 5 years old when the photograph was taken. Incidental-

ly, the temperature at Glenn Dale in some winters falls to between -10° and -15° Fahr., and rarely as low as -23° . In light soils the rhizomes of some of these bamboos may grow under such a barrier and come up on the outside, and there is always the probability that those of all the running species will come to the surface and go "over the top" into the soil outside and continue to spread, unless watched and cut off when they start to go over. In some central background of this photograph is a developing "clump" of one of the giant hardy bamboos, *Phyllostachys nigra* var. *henonis* (Mitf.) Stapf ex Rendle, and at the left of this, the larger-leaved and shorter-culmed *Pseudosasa japonica* (Sieb. & Zucc.) Makino. These will be referred to again elsewhere.

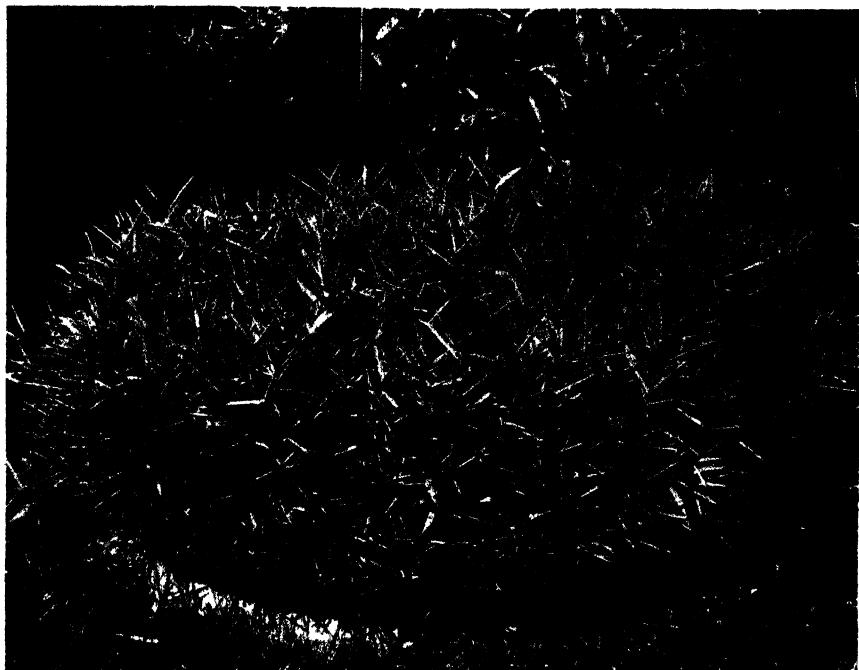
Arundinaria graminea (Mitf.) Makino, in the foreground of the photograph, is only $3\frac{1}{2}$ feet high here but is reported to reach 9 to 16 feet in localities with a less rigorous winter climate. (A good mulch in winter will prevent or at least reduce cold injury to the rhizomes.) The leaves of *A. graminea*, as can be seen and as the specific name suggests, are distinctly grasslike—4 to 10 inches long and from less than a quarter to scarcely a half inch wide. Botanical synonyms for this species are *A. hindsii* var. *graminea* and *Pleioblastus gramineus*. The plant is a native of Japan but was introduced into this country from a European source, as have been most of our other oriental bamboos of small and medium size. One of the Japanese names for this species, Taininchiku, is said to mean "Great Ming bamboo."

Sasa chrysantha (Mitf.) E. G. Camus (*Arundinaria chrysantha*), a larger-leaved species at the left and behind *Arundinaria graminea*, has here grown to nearly 5 feet in height. Its maximum is probably a little taller. Branch-

es arise from the upper nodes of the culm, bearing 5-7 oblong-lanceolate leaves, 3-7 inches long and up to $\frac{3}{4}$ inch wide. A bamboo of this character, although definitely a runner, can rather easily be kept in clump form without curbing the rhizomes by simply cutting during the sprouting season the shoots that appear outside of the allotted space.

Sasa pumila, to the right of *S. chrysantha* and shown also in two closer views on page 176, is a dwarf species, growing to a height of about 2 feet in cool climates or in partial shade in warmer ones. Its branches rather freely from the upper nodes of the culm and each branch bears 4-7 oblong-lanceolate leaves $1\frac{1}{2}$ - $3\frac{1}{2}$ inches long and $\frac{1}{4}$ to nearly $\frac{5}{8}$ inch wide, gathered near the tips of culms and branches. The leaves tend to curl, or roll up, in dry and sunny situations in summer, as shown in the lower photograph on page 176. In very warm situations, with mild winters, the entire plant, including the leaves, becomes so much reduced in size and appearance as to cause one to suspect its being of some different species. Because of its small size and rampant rhizomes, *S. pumila* may easily become a weed; it is very difficult to eradicate when it escapes into a garden and especially when it invades a lawn.

Shibatata kumasaca (Steud.) Nakai, appearing at the right, back of *Sasa pumila* in the photograph previously mentioned and in a close view on page 177, is a broad-leaved little bamboo 3 to 6 feet high. Other names, but without botanical standing, that have been used in the literature for this species are: *Shibatata kumasasa* (variant of *kumasaca*), *S. ruscifolia*, *Phyllostachys kumasaca*, *P. ruscifolia*, and *Bambusa viminialis*. This bamboo is a native of Japan. There are usually 3 to 5 dark-green, ovate-lanceolate



Arundinaria viridi-striata, a dwarf bamboo—roots confined—with yellow-striped leaves; the leaves curl in bright sunlight. (Plants 28 inches high.)

leaves at each of the upper 8 or 10 nodes of the slender culm; they are $1\frac{1}{2}$ -3 inches long and are usually terminal on very short branches—which commonly range from $\frac{3}{4}$ to $\frac{1}{2}$ inch in length but rarely considerably longer. The leaves suffer more or less injury at temperatures below 10° F., but if the rhizomes have been protected by a winter mulch, full recovery will take place during the early summer. The plant is not a very rapid spreader. In Japan it has a half-dozen different common names, the one preferred apparently being Okamezasa.

Arundinaria viridi-striata [Regel] Makino ex Nakai is the name now accepted for an attractive dwarf bamboo with leaves that are striped green-and-yellow in spring and early summer; later in the summer the yellow striping

tends to disappear and the leaf to become all green. The plant, native to China and Japan, is $1\frac{1}{2}$ to $2\frac{1}{2}$ feet high, and the culms, with their 1 or 2 long ascending branches from near the base, bear 3 to 5 leaves 2 to 5 inches long and $\frac{1}{2}$ to 1 inch wide, mostly clustered near the apex. The leaf is glabrous—free from any hairiness—on the upper surface and shortly velvety-pubescent beneath; it curls in strong sunlight. The leaves are all killed even in the milder winters at Glenn Dale, and the development of the new leaves in spring is a little slower than in most dwarf bamboos. However, the plant will make a handsome ground cover where the climate is not too severe. Some of the rather numerous synonyms by which this little bamboo has been known are: *Rambusa*

viridi-striata, *Arundinaria variabilis* var. *viridi-striata*, *A. variegata* var. *viridi-striata*, *Pleioblastus viridi-striatus*, *Arundinaria auricoma*, and *Sasa auricoma*. The Japanese common name for it is Kamurozasa.

Sasa variegata (Miquel) E. G. Camus, the handsome little Japanese bamboo shown on page 181, has leaves conspicuously striped with white or creamy white. *S. variegata* has been reported to grow only 1½ to 2 feet high, but the culms of the plant grown at Glenn Dale have attained slightly over 3 feet in height. Branches arise, somewhat irregularly, from one or two nodes of the culm the first year and others come later. The white-striped, oblong-lanceolate leaves, well rounded at the base, are finely pubescent beneath; they are 5 to 10 in number, usually gathered near the culm tip and the tips of the branches and are from 2 to 6 inches long. The plant is a little more cold-resistant than the preceding. While the identity of our present plant has not been previously questioned, it now seems to me possible that an apparently similar species described under the name *S. argenteo-striata* (Regel) E. G. Camus (transferred by Dr. Nakai to *Pleioblastus*) may be involved. The height of our plant coincides with that given for *S. argenteo-striata* and the leaf variegation indicated that it seems to agree, but there are also points of disagreement. Since the true identity of the plant under consideration is at present in doubt, it is of course useless to give synonyms for the name *S. variegata* here. I shall hope to get the question cleared up later.

Sasa pygmaca (Miquel) E. G. Camus, as its name implies, is considered to be one of the smallest of the bamboos. It is native to Japan. In some environments, especially in a warm climate, it seldom exceeds 6 to 10

inches in height. The plants in the road border shown in the accompanying photograph at Biltmore, North Carolina, were within this range, though in another location culms about 18 inches tall were collected. The oblong leaves, clustered in numbers of 3 to 7 at the apex of culm and branches, are 1 to 3 inches long by 3/16 to 7/16 inch wide; they are shortly pubescent beneath. This attractive little bamboo in its proper place might prove valuable as a ground cover in situations where ordinary grasses do not thrive. Because of the slenderness of its stems it may even be possible to mow it. Should it invade an ordinary lawn, however, it would doubtless make real trouble for the owner. *S. pygmaca*, originally described as *Bambusa pygmaca*, has since had three different designations in the genus *Arundinaria* and, more recently, has also been placed in *Pleioblastus*. Its Japanese name is Keoroshimachiku.

Sasa disticha, (Mitf.) E. G. Camus is an attractive, fern-leaved, hardy bamboo, native to Japan. It grows in time to heights of 3 to 5 feet in a very favorable environment such as that at the Biltmore Estate in North Carolina, shown in the photograph on page 183. The fern-leaf character in bamboos results from a reduction in size of leaf simultaneously with an increase in the number of leaf-bearing nodes and a shortening of the length of the internodes, so that the natural 2-ranked arrangement of the leaves is accentuated. The degree of development of this character varies considerably and it occasionally tends to disappear when growth is unusually vigorous. The small planting at the Biltmore Estate was 38 years old according to Mr. C. D. Beadle, who has been in charge of the horticultural work there from the beginning and by whose courtesy I was enabled to take this and other pho-



Sasa variegata, a dwarf bamboo—roots confined—with white-striped leaves.
(Plants 2 feet high. *Phyllostachys viridi-glaucescens* in background.)

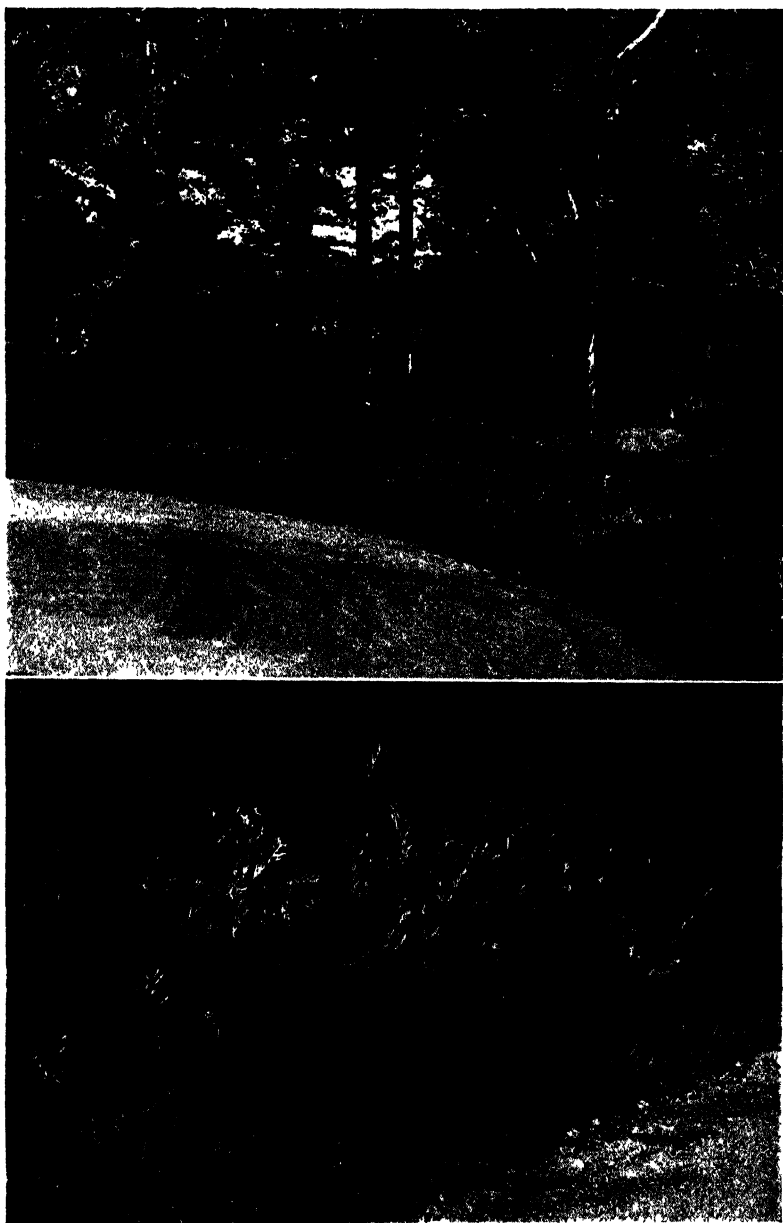
tographs, in 1935. It had spread comparatively little in all that time. This is a very dainty-looking bamboo in its smaller stages of development, as when grown in a pot.

There is some question as to the correct botanical status of this bamboo and it is possible that its treatment as a variety of the preceding species, *pygmaea*, as has already been done by Dr. T. Nakai, a leading Japanese botanist, will become generally accepted. However, he placed it in the genus *Pleioblastus*, which in this paper is being recognized only in the synonymy. The fact that *S. disticha* is generally recognized as growing to considerably larger size than *pygmaea* seems to me to give some reason to question the correctness of considering it only as a variety of the latter. For these reasons I have chosen here to accord the plant specific rank, using the original specific name. Following are some of the other names by which it has been known in the past: *Bambusa disticha*; *Arundinaria variabilis* var. *pygmaea*; *A. variabilis* var. *disticha*; *A. variegata* var. *oroshima*; *Pleioblastus variegatus* var. *oroshima*; *P. pygmaeus* var. *distichus*. The Japanese name for this bamboo is Oroshimachiku, meaning Oro Island bamboo. It is said to be grown mostly as a pot plant in Japan.

Sasa veitchii (Carr.) Rehder, of which a little group of plants is shown on page 184, is a dwarf broad-leaved bamboo from Japan, with leaves roughly resembling in shape those of *S. palmata* but much smaller and quite distinct in detailed characters. The little culm sheaths are at first densely white-hairy, which serve to help in identification. The leaves, dark green above and glaucous beneath, are usually oblong, 2 to 7 inches long and $\frac{5}{8}$ to $1\frac{1}{2}$ inches wide, broadly tapering or rounded at the base, and with 5 to 8 pairs of secondary veins. There is a

tendency of the leaves to decay on the margins and turn brown to whitish in the later autumn or winter. This is very striking and characteristic in some situations, and when the first description was published the plant was given the varietal name *albo-marginata* under *Phyllostachys bambusoides*, to which it is, of course, unrelated. The plants in the photograph are 15 inches high and represent average growth, though it is reported that in England culms have sometimes attained heights of 3 to 4 feet. Near Savannah, Georgia—a warmer climate—the average height has been scarcely 12 inches, and it is undoubtedly better adapted to cooler conditions. This little bamboo, in a small planting, can be kept in attractive appearance during the summer and early autumn by the removal in spring of dead or injured leaves and stems. It can also be useful as a ground cover for somewhat larger areas in some situations. *S. veitchii* was first described as a species as *Bambusa veitchii* and later was for some time known as *Arundinaria veitchii*. In the meantime, after the publication of the name *Bambusa veitchii*, the varietal name *albo-marginata* was raised to specific rank, in the genus *Arundinaria*, by the eminent Japanese botanist Dr. Tomitaro Makino. This action was invalid under the rules of botanical nomenclature, however, in view of the prior publication of *B. veitchii*. The combination *Sasa albo-marginata*, made later by Makino and Shibata, is invalid for the same reason. The Japanese common name for *S. veitchii* is Kumazasa.

Sasa tessellata (Munro) Makino & Shibata, a large-leaved, very low-growing, species from China, shown on page 185, has the distinction of bearing probably the largest leaves of all known bamboos. The height of the plant is only $2\frac{1}{2}$ to 3 feet, but the leaves have



Sasa pygmaea, a very dwarf bamboo, bordering curve of road on the Biltmore Estate, Biltmore, N. C. (Plants about 10 inches high.) *Sasa disticha*, the dwarf hardy Fernleaf bamboo, beside a road on the Biltmore Estate. Ordinarily a much smaller plant, its tallest culms in this semi-shaded situation are nearly 5 feet high.



Sasa veitchii, a dwarf broad-leaved running bamboo, growing usually to only 15 inches or less in height.

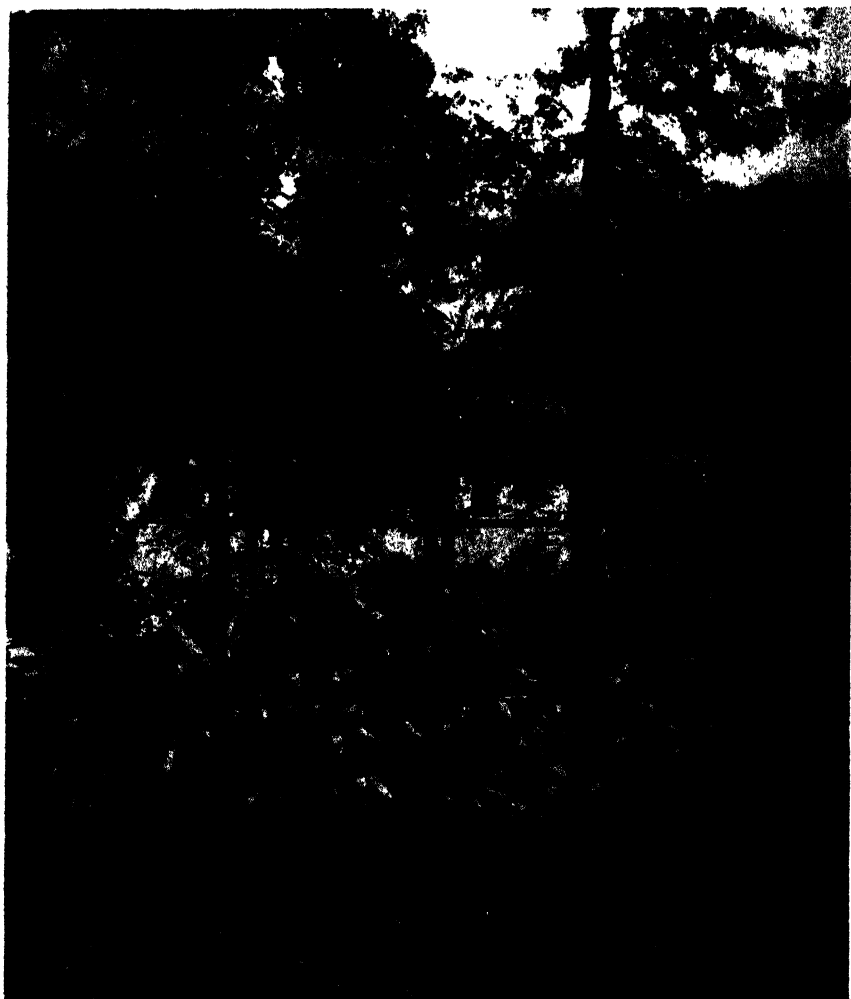


Sasa tessellata, one of the largest-leaved of all bamboos but of low stature, rarely taller than 3 feet. (Roots confined.)

measured from about 10 to as much as 23 inches in length and from $1\frac{3}{4}$ to $3\frac{1}{2}$ inches wide, at Glenn Dale, Md. W. J. Bean, in England many years ago, reported leaves even broader, though not so long. In shape the leaves are oblong, tapering broadly at the base and rather narrowly to a sharp point at the apex. They are medium green above, glaucous beneath, and are regularly 2 in number at tip of the culm the first year, there being no branches developed that year; the midrib is conspicuously yellowish. The culm is rather short-jointed, there being 2 internodes about 4 inches long near the base, with the higher ones gradually shorter, and the smooth, brownish-yellow culm sheaths are respectively from $1\frac{1}{2}$ to $3\frac{1}{2}$ times the length of the internode above the attachment. The plant is interesting in a collection of bamboos but can not be

rated as very ornamental under ordinary conditions. This unique bamboo, originally named *Bambusa tessellata* by Colonel Munro, was stated by him to have been described from only "the dried leaves of this species when sewn together and in the state so largely used by the Chinese in packing their tea." It was introduced into Europe before 1845, probably the first of the bamboos from China or Japan. Other synonyms of *S. tessellata* are *Arundinaria tessellata* and *A. ragamowskii*.

Sasa palmata (Mitf.) E. G. Camus appears at present to be the correct name for the handsome large-leaved Japanese bamboo pictured on page 186, which for some time we have supposed to be *S. senanensis* (Fr. & Sav.) Rehder. The latter species is considered by Dr. T. Nakai to be a quite different plant, which has not yet been introduced into this country, so far as I



Sasa palmata, one of the larger-leaved bamboos, growing here to about 5 feet high. Old U. S. Botanical Garden, Washington, D. C.

know. The transfer of the species *palmata* to the genus *Sasa* by Camus (in 1913) was done defectively, as was the similar subsequent and independent action of Nakai (1934), and the status of the name is still unsettled. The plant that we are here calling *S. palmata* is one of the most striking of the medium-low hardy bamboos. The culms, curving upward from the base, often grow

5 to 6 feet tall and in very favorable situations will reach 7 or 8 feet. Branches arise singly from some of the middle and upper nodes of the culm and later a secondary branch may grow from the base of a primary. The leaves, bright green above and glaucous beneath, are borne in palmate clusters of 3 to 9 at the apex of the culm and the tips of the branches. They are

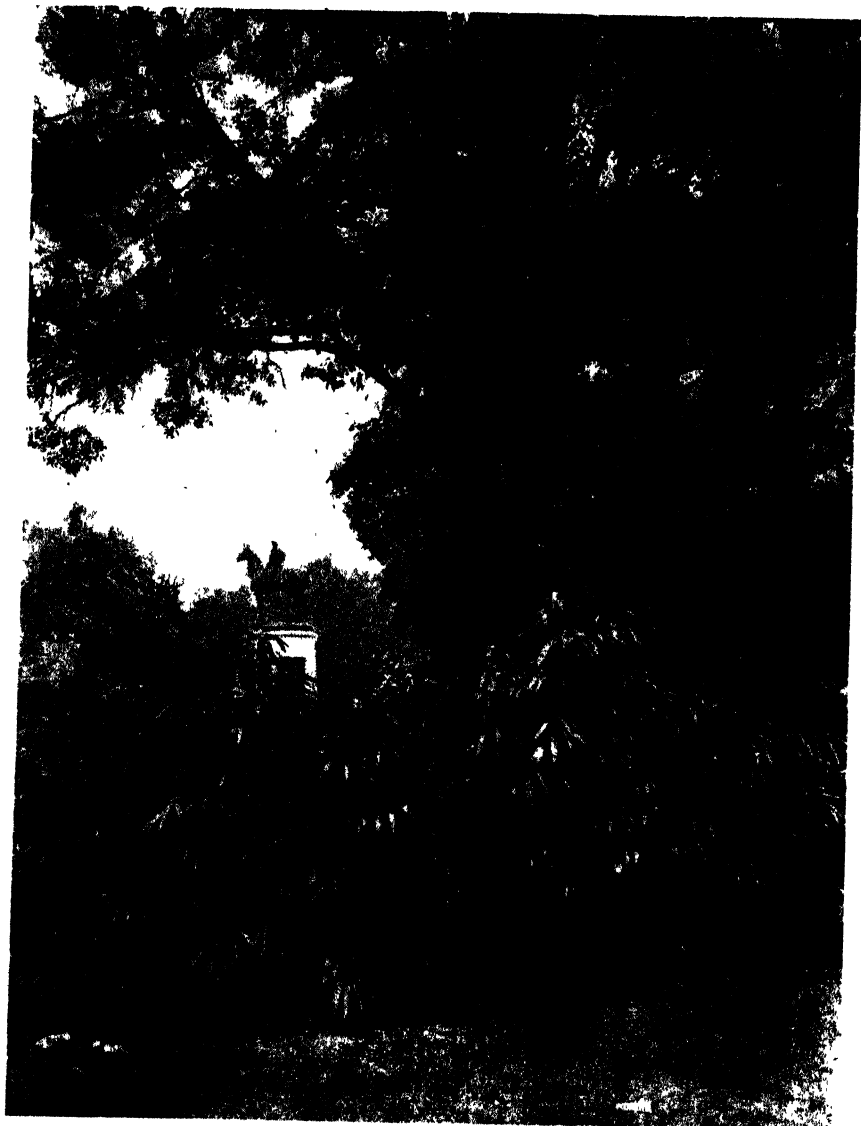


Arundinaria longiaurita, a large-leaved bamboo with internodes of culm very long and nearly solid. Height of plants up to 5 feet. U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Georgia.

among the largest in bamboos, measuring up to 15 inches long by $3\frac{1}{2}$ inches wide and being exceeded in length, I believe, only by the leaves of *S. tessellata*. They are oblong to oblong-lanceolate, tapering broadly at the base. The secondary veins, 8-12 in each side of the midvein of the leaf, are very prominent, especially when viewed with transmitted light, and enhance the beauty of the plant. The culm sheaths are nearly all much shorter than the internodes. The entire plant is free of hairiness or pubescence. This bamboo is generally neat in habit and makes an exceedingly attractive appearance where mass effect is desired and where

the winter climate is not too severe; it is but little injured at temperatures above 5° F. When it becomes ragged, as it will, it may sometimes be desirable to cut out part or all of the old growth in the early spring. Besides the misidentification of our plant as *S. senanensis*, it has been known at various times, in Europe or in Japan, under the synonyms *Bambusa palmata*, *Arundinaria palmata*, *A. paniculata* forma *chimaki-sasa*, *Sasa paniculata*, and *S. australis*.

Arundinaria longiaurita (Hand.-Mazz.) Hand.-Mazz., another broad-leaved bamboo from China, shown on this page. It occurs in the wild in the



Pseudosasa japonica, the well-known Metake, at the old U. S. Botanical Garden, Washington, D. C. Plants up to 7 feet tall.

Lungtau Mountains, where it is called by the Chinese, Tip mo chuk. The plants in the photograph are 3 to 5 feet high but heights up to 12 feet in the above region were reported by Dr. F. A. McClure, who collected it there.

The rather rough culms, up to $\frac{5}{8}$ inch in diameter, are tough and have very long internodes with extremely small cavities. The taller culms bear stiff upright branches but usually only on the upper part and should therefore be es-



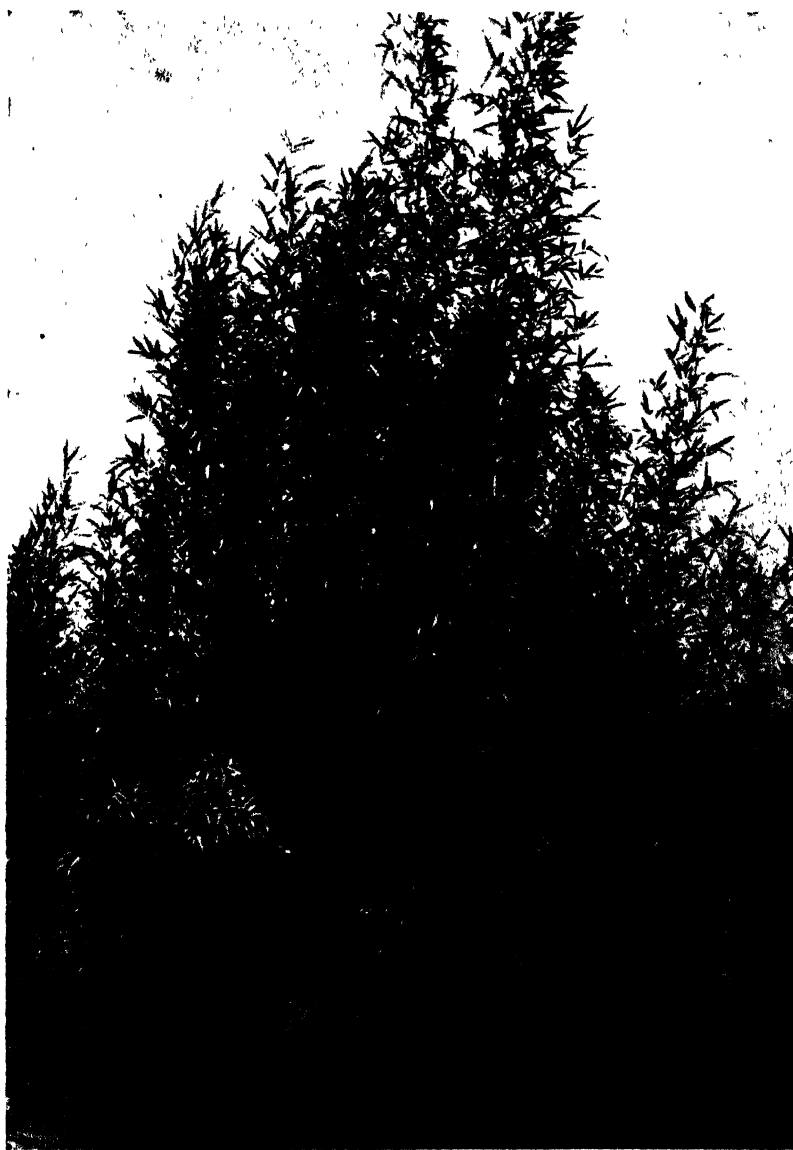
Arundinaria simoni. A planting of a medium-sized form of this variable, narrow-leaved species as grown at the U. S. Barbour Lathrop Plant Introduction Garden, Savannah, Georgia. The tallest culms here are about 8 feet high.

pecially useful for small plant stakes. The leaves are oblong, 5-10 inches long and from less than 1 inch to nearly 2 inches wide. The plant is hardly to be considered ornamental. This bamboo has but one synonym, *Indocalamus longiauritus*.

Pseudosasa japonica (Steudel) Makino, still widely known under its earlier name, *Arundinaria japonica*, is believed to be the earliest of the hardy oriental bamboos to be introduced into the United States. It came, of course, by way of Europe, sometime after 1850, and it probably is still the best known and most widely grown species in decorative plantings, especially in the more northern areas in which bamboos thrive. An attractive group of plants that grew in the old U. S. Botanical Garden shortly before it was moved to its present site is shown on page 188. Besides the rather handsome leaves, evergreen down to about 7° F., and the ease of growing the plant, the comparatively slow spreading of the rhizomes is a characteristic by which this bamboo doubtless has largely earned its popularity. It more nearly "stays put" than almost any other hardy bamboo that might otherwise have competed with it. The erect culms commonly grow from 6 to 10 feet high, even where they are killed by cold every few years, and in warmer localities they sometimes reach 16 feet or more. Semi-erect branches grow singly from some of the upper nodes, and these, with the apical section of the culm, bear clusters of 4 to 11 narrow-oblong leaves 5 to 13 inches long, wedge-shaped at the base; they are glossy dark green above and somewhat glaucous beneath. The culm sheaths, except at the lower nodes, are about as long as the internodes or longer; they are stiff-hairy at first, later becoming smooth, and they adhere until they decay. Other synonyms of

Pseudosasa japonica are *Bambusa metake*, *Arundinaria metake*, and *Sasa japonica*. The accepted Japanese common name for our present plant in Yadake, though it presumably at one time also was called Metake, by which name we recognize it in this country.

Arundinaria simoni (Carr.) A. & C. Rivière, a variable bamboo from Japan, as shown on page 189, represents one of the several forms the species assumes, supposedly by way of its seedlings. This one, being grown at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Georgia, was received about 18 years ago from Florida; it had been obtained earlier from a European source. This is a form of medium stature, the tallest culms being about 8 feet. A more dwarf form—not over 5 feet high—of *A. simoni* is known in Florida, also a much larger and more vigorous one, the latter reported to have much promise of value for certain industrial uses. The tallest culms of this exceed 20 feet in height. A report has also come recently from New Jersey of a small planting of a form similar in stature to the larger one in Florida, though it probably is hardier. It is not completely hardy in New Jersey but the height of culms reported—20 feet—seems to indicate a high degree of cold resistance. While I do not think of *A. simoni* as a very ornamental bamboo, the absence of any strong tendency to run in the two smaller forms mentioned above is a point in their favor where limited spaces are being considered. The tall form from Florida, however, is a more active spreader. The leaves of *A. simoni* are narrow-oblong, sometimes almost linear, from 3 to 12 inches long and from $\frac{1}{8}$ to about $1\frac{1}{4}$ inches wide at most. Occasionally a white stripe appears. It has been pointed out recently that the original description of the species provided for



Semiarundinaria fastuosa, the Narihira bamboo, one of the handsomest of the medium-sized hardy bamboos. The tallest culms here are 19 feet high. U. S. Barbour Lathrop Plant Introduction Garden. (Photo by D. A. Bisset, U.S.D.A.)

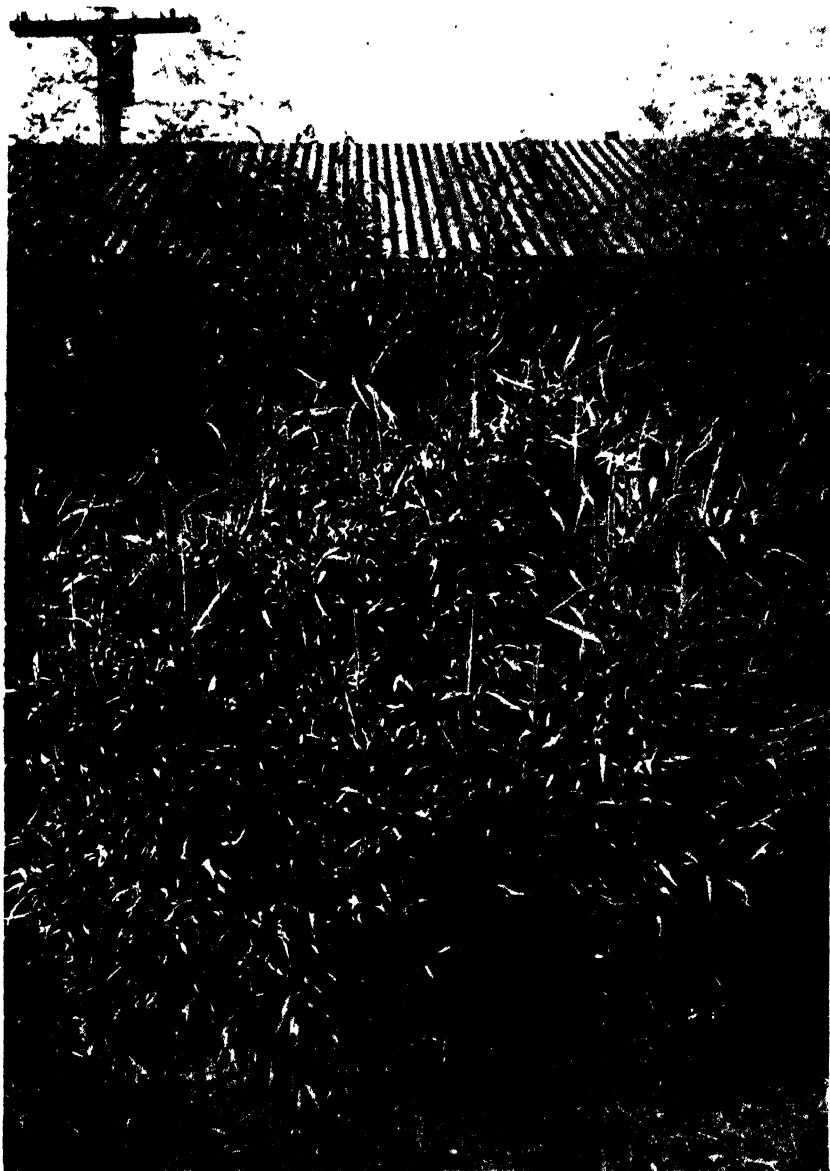


Arundinaria gigantea, the canebreak bamboo. This form of the species, growing beside a road on the Biltmore Estate, does not there exceed about 14 feet in height.

striped leaves, as well as for great variation in comparative width of leaf. Notwithstanding this fact, the botanical varieties *variegata* and *heterophylla* were later published for the stripe-leaved form and the forms in which both the very narrow and the wide leaves are conspicuously present. It would seem more appropriate to treat these simply as horticultural varieties, without separate botanical status. The Japanese name for *A. simoni* is Medake (which should never be confused with Madake, *Phyllostachys bambus-*

oides, or with Metake, *Pseudosasa japonica*.)

Arundinaria simoni var. *variegata* Hook. fil, which might be called the silverstripe bamboo, not illustrated. It originated in Japan and is distinguished from the type by having usually rather small, very slender, and more or less white-striped leaves. The variety grows much taller and is more vigorous in rhizome activity than the smaller forms of the type (plants with nearly all plain green leaves); it more nearly approximates in stature and



Arundinaria tecta, the Switchcane. This form of the species, grown with roots confined, at the U. S. Plant Introduction Garden, Glenn Dale, Maryland, is one of several rather distinct ones occurring in different parts of the southeastern quarter of the country.

vigor the larger forms of *A. simoni* that have recently come to our knowledge. The leaves of the silverstripe bamboo are extremely variable in their proportions and in the degree of striping. Many leaves have a single stripe, either threadlike or much wider, while others have 2 or 3 stripes or may be entirely green or, occasionally, almost entirely white. They are from 2 to 7 inches long and from about $\frac{1}{8}$ to $\frac{1}{2}$ inch wide. Both shorter and longer leaves may be either very narrow or quite wide. At times, some leaves may be entirely green and almost as large as in the type. The plant has limited possibilities as an ornamental. Synonyms by which this variety has been known are *Arundinaria simoni* var. *albo-striata*, *A. simoni* var. *striata*, and *Pleioblastus simoni* var. *variegatus*.

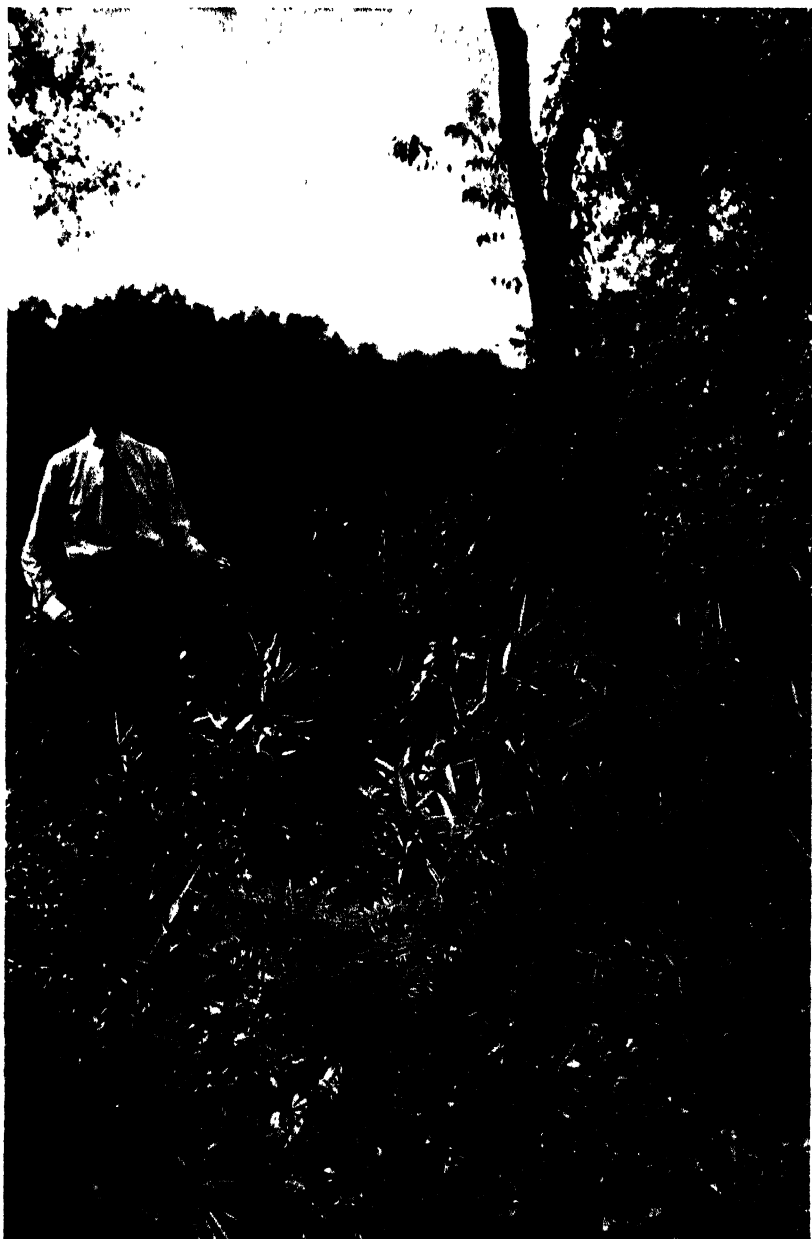
Semiarundinaria fastuosa (Mitf.) Makino is the stateliest, if not the handsomest, of the hardy bamboos. Narihira-dake, the Japanese name for it, has allusion to the general appearance of the plant, as does also the Latin specific name, *fastuosa*. Narihira is said to have been a sort of legendary Beau Brummel. We may call the plant the Narihira bamboo. The culms grow ultimately to heights up to 25 feet or more in a mild climate. The rhizomes are less active than those of most running bamboos, which results in slow spreading. The smaller culms are generally densely clothed for almost their entire length by the rich dark-green, oblong to oblong-lanceolate leaves, which are from 4 to 7 inches long and are borne on short, rather upright, branches. The smooth straw-colored culm sheaths often hang on in a semi-detached state for a number of weeks after the new culms have completed their growth and are quite characteristic during that period. The species fortunately is one of the hardiest and withstands temperatures almost to zero

F. with little injury. Like most other running bamboos it can be kept within almost any desired limits by keeping all shoots cut back that appear outside the set limits. There are many other things that might be said concerning this splendid bamboo but space does not permit. The synonyms are *Bambusa fastuosa*, *Arundinaria fastuosa*, *A. narihira*.

NATIVE BAMBOOS OF THE SOUTH

The native bamboos of the southeastern quarter of the United States are hardly subjects for ornamental horticulture but I think they may at least be mentioned when the subject of bamboos in the United States is being considered.

Arundinaria gigantea (Walt.) Chapm. (*A. macrosperma*) is the large bamboo of the famous canebrakes that a century and more ago covered considerable areas in many sections of the South. A photograph of part of a small original patch of this species on the Biltmore Estate, Biltmore, N. C., appears on page 192. The greatest height of culm here was about 14 feet. Leaves on mature culms measured $1\frac{1}{2}$ to nearly 5 inches long and $\frac{3}{16}$ to $\frac{1}{2}$ inch wide. Much farther south—from South Carolina to Louisiana—heights up to at least 30 feet undoubtedly have been common in former years. Occasionally it has been reported that in the early days canes nearly or quite 40 feet high were found, but in the absence of evidence that actual measurements or even very careful estimates were made, I doubt that full acceptance of the reports is justified. Whether the comparatively low stature of the form at Biltmore is due mainly to climatic or soil factors or to differences in the bamboo itself can only be surmised but all three of these considerations may well be involved. It would not be strange if there were geographical forms of the species. While the



Arundinaria tecta var. *decidua*, a variety common in western North Carolina, which drops its leaves in the autumn, with Mr. C. D. Beadle who originally described and named it. (See page 196.)

plants shown in the photograph are not distinctly ornamental. I believe that there may well be situations in which a small patch would be of interest and not seriously disfiguring. In regard to the question of a common name for *A. gigantea*, it has long seemed to me that one more distinctive than any used or yet proposed should be found and brought into use. The word "cane," which is a part of all the names used thus far, is in too general use, not only for other large grasses but for parts of other plants. I propose here the name "canebreak bamboo," which seems to me both distinctive and descriptive.

Arundinaria tecta (Walt.) Muhl., the switchcane, or small cane, seems probably to be a composite species or, at least, a species with rather numerous geographical forms. Mr. Beadle of the Biltmore Estate has made numerous observations and collections of foliage specimens of several diverse forms at different points in the Southeast as steps toward the resolving of the question of what "*A. tecta*" really is or comprises. The specimens are in my care. The photograph on page 193 is of a form of *A. tecta* received from the Royal Botanic Gardens, Kew, England, which they had obtained a great many years ago, under the name *A. macrosperma*, from this country. More than one observer, however, in examining the bamboos at Kew, had noted that this plant was much more like *tecta* than *macrosperma*. The locality of its original collection in this country is not known, I believe. Plants of this form grown at Savannah, Georgia,

have leaves $1\frac{1}{2}$ - $4\frac{1}{2}$ inches long and $3/16$ - $\frac{1}{4}$ inch wide on second-year culms; leaves on first-year culms are larger, with length of 3-7 inches. *A. tecta*, like many other bamboos, is not adapted for ornamental plantings in general, but where there is particular interest in bamboos, one or more of the forms might well be included in a collection if desired and if they could be obtained.

Arundinaria tecta var. *decidua* C. D. Beadle is a deciduous variety which Mr. Beadle states is common in western North Carolina. It is found on the Biltmore Estate, beside the French Broad River and bordering small watercourses that flow into it several miles above Biltmore. The name, with a brief description, was published in Bailey's Standard Cyclopedia of Horticulture, 1914 edition, but I have found no other references to it in the literature. The plant differs from the most closely similar nondeciduous forms of *A. tecta* especially in its deciduous habit. The variety at this place—the type locality, altitude 2,200 feet—grows to heights scarcely exceeding $4\frac{1}{2}$ feet. Its leaves are 2-7 inches long and $3/16$ - $5/8$ inch wide. They turn yellow and fall in the autumn. This little deciduous bamboo has not been known to flower in the fifty years during which it has been under observation by Mr. Beadle. It was my good fortune to visit the type locality of *A. tecta* var. *decidua* in company with him at the beginning of September in 1935 and to take a photograph of part of the small patch, with him standing among the plants. This is shown on page 195.

Hemerocallis through the Year

J. B. S. NORTON

One of the few flowers that can be depended on for bloom throughout the growing season is the daylily genus. A selection of suitable varieties will yield flowers from late April to frost in October in the climate of Washington. They can be carried further as house plants in November and later, and perhaps in early spring.

The number of clones of hemerocallis that have published names is now close to 1,000, and many new ones are coming into culture each year. Some of these differ little from one another, but the variation in color, form, size, and season in this genus is so great that there is a possibility for tens of thousands of quite distinct varieties. So if one is to keep a garden collection within reasonable limits, a great many kinds must be omitted.

However, with all this wealth of new material, the common wild Europa and its related double variety, with a few lemonlilies in spring and maybe a late lemonlily in July is about all we see in most gardens. How slowly new flowers come into use!

The following selections for all blooming seasons are from one man's observations on a collection of some 300 varieties, with visits to a number of other gardens, including the daylily collections at the New York Botanical Garden and at Reading, Pennsylvania. The best of each color type was selected for each week in the blooming season. They are listed here in seasonal order of the time blooming begins. The most of them bloom for three to six weeks.

Many outstanding new kinds could have been included had they been better known. Very few of those originated

by the writer are mentioned; the proverb, "Let another man praise thee," is a good guide in plant breeding. But one of the easiest ways for any one to satisfy his own desires in the search for beauty is to pick his choices from a field of hybrid hemerocallis grown from seeds.

One of the earliest daylilies to bloom is the rather dwarf, orange Dr. Regel. Some of the early May varieties are tall for the season: of these, the yellow flowered Elizabeth may be mentioned.

The second week of May brings in Tangerine, orange color, and the yellow, large flowered Earliana.

The third week of May has the greatest wealth of spring bloom in the hemerocallis garden. The bright orange Aureole, dwarfish, with rather narrow petals; the light buff Sovereign with brown tinge on the outside of the buds; and the long and profusely blooming Apricot, with light yellow wide petals, frilled on the edges, are old, well tried varieties of this period, blooming through to the end of May or early June. Among the host of yellow and orange May bloomers the red and brown summer colors have been moved back in Buckeye with large blocks of brown on the petals as in Mikado, and in later May, in Brunette, which is red brown all over.

There is a gap in daylily blooming the last of May and first of June. The masses of flowers about May 25 suddenly disappear, to be gradually renewed through June by more and more of the summer blooming kinds. But several fine varieties begin to flower then, and mass plantings of them can fill the need. Semperflorens is the best yellow. It has a strong and beau-

tiful plant, the scape well branched with many buds, the flowers wide and full, from late May to mid June. A very excellent large flowered orange of good form is Sungold. *Domestica* and *Ajax* are other fine, large, orange colored bloomers of this mid season between spring and summer blooming *hemerocallis*.

Gaiety is a very large, pale yellow, making a striking display, but the segments are too long to meet well. Modesty is a smaller but better formed lemon of the first week of June.

The yellow and orange selfs seem to please most gardeners better than the newer reds, browns and mixed colors, but those looking for newer and different colors and color combinations will begin to see them by June tenth. Bagdad begins then with a peculiar mixture of brown and orange. A brilliant red of novel tone comes in Creamore Henna. Hannah Dustin is a light yellow of beautiful form in this period. Estelle Friend, a somewhat fulvous bicolor, may also be mentioned.

The middle of June introduces a greater variety. The seedling rows of this season show wonderful variation of many colors and forms. Among a few of the best named varieties are the small summer *H. multiflora* hybrids, tending to have rounded segment tips: Bijou and Saturn. *H. aurantiaca major* is a big, red tinted orange. Bicolor, petals rosy red and sepals yellow is one of the best bicolors.

The light yellow, smooth petaled Patricia begins to flower the last half of June. By many it is placed among the highest rating daylilies. Europa, introduced and wild all over the world, one of the oldest varieties known, is still fine in form and vigor, if not in color; its glory somewhat dampened by being so abundant and aggressive, flowers in late June and early July. Another of late June is Mikado, yellow,

with large, brown patches on each of the three petals; for years the highest rated daylily. J. A. Crawford is a good large yellow of this blooming season.

The last week of June gives us one of the very best light yellows. Hyperion. Ophir, a stronger yellow, vies with it for the top place in yellows, and blooms about the same time. The garden is so full now of fine large yellow flowered *hemerocallis*, it is hard to know which to omit. The very large Mongol and Golden West may be added to those above. In other colors, Port is a good red; Burgundy a well formed brown; Peony Red is a near crimson; Frances is a peculiar orange brown with a well formed rather flat flower. Others of late June are the exquisite orange pink Afterglow; Triumph, a red orange of great vigor, continuing to bloom into September; and Caballero, another fine bicolor.

Here near Washington, early July is the peak of the daylily season, with more varieties blooming, and a greater variation in form and color than at any other time in the year. Of those not already mentioned and still in flower, Golden Fulva is a good red orange. Theron is almost black; a novel color, but one that makes it very inconspicuous in the garden. La Tulipe has wide dark red petals and yellow sepals, and the beautiful form so well shown in Shull's design on the cover of the 1941 *Herbertia*. Maculata is the most conspicuous clone of *H. fulva*. The best of the few doubles is Kwanso, a near relative of Maculata. Another double of this season is more attractive for its clearly white striped leaves than for the flowers.

Near mid July, Palemoon is one of the best light yellows. Aztec Gold is one of the most attractive of daylilies, with strong many-flowered scape and rich orange colored flowers of some-

what orchidlike irregular form. Rajah is one of the finest reds, with darker areas about the throat. Another good one of mid July is Gloaming, of unusual color, a buff, shaded dull orange red.

Just after the middle of July, when the mass of many colored varieties is beginning to decline, some of the finest kinds flower as a late mid-summer rear guard. Rosalind, highly prized as a near rose pink derivative of *H. fulva rosea*, is one. Another *H. fulva* is the orange red Cypriana. The orange buff Vestal with darker throat spots, continues to bloom into September. Mrs. W. H. Wyman, a small flowered, late yellow, is an old timer, still worthy. Many promising new kinds, not yet fully tested help to fill this late summer period.

Later in July, August Pioneer, the first good August bloomer out of *H. multiflora*, begins flowering. It has small, yellow flowers, pinkish tinted on the petals, and so is a scarcely noticeable bicolor. The related Boutonniere may also be included here. Jean Watson continues to bloom profusely from late July until the middle of September. It is another slightly bicolored flower of rather unhappy yellow and pinkish. Queen Bess is quite similar. Chengtu, orange red, can be justified in the vegetable garden as the one most used as food, though many others are liked by epicures. The buds, ready to open, are parboiled, the water poured off, and the buds then cooked with salt, pepper, and butter. Some of the yellow flowered species have a slightly irritating taste.

A number of those already mentioned continue to flower during August and part of September. Several good clones not yet introduced begin to flower in August. Autumn Prince, with many small light yellow flowers is still blooming the middle of October, as is Hankow an orange red of *H. fulva* parentage.

Some of the May blooming varieties begin again in September and October and insure some bloom till frost, but can not be depended on, as their flowers are poorer and stems softer than in spring. Hybrids of Hankow and other late bloomers promise to give us some really fine late fall varieties.

With the multitude of new hemerocallis being introduced each year, any list must be tentative, and vary with climate, location, and individual tastes. The large number of new kinds should not be deprecated too much, as many of them are certain to be improvements on older ones like them, the possibilities in breeding this flower having only begun to be realized.

But the general garden must be limited to a small number that can find room among other desired ornamentals. The following reduced list is what the writer would select to start anew on a small place, arranged in seasonal order from early May to October: Dr. Regel, Earliana, Semperflorens, Sungold, Bicolor, Patricia, Mikado, Hyperion, Ophir, Afterglow, Triumph, Theron, Maculata, Aztec Gold, Rajah, Rosalind, Autumn Prince, Hankow. Some finer newer kinds are omitted on account of high price and lack of experience with them.

Gardening with Daylilies

J. MARION SHULL

The average American gardener is not yet aware of the Garden Magic lying easily within his reach, provided by fairly recent development in the field of *Hemerocallis*. True there have been daylilies time out of mind, and they must have been well thought of long ago to have received that appellation, Beautiful-for-a-day, but their true capacity for garden service is still only appreciated by a few.

We garden for many and varied reasons; some of us are artists bent on making pictures to delight the eye; some work like the jeweler to create the perfect gem of an individual bloom; some, like the scientist, searching for understanding through all the varied wonders of plant growth and development; and some for rivalry of fellow gardeners, proud of producing the biggest or best and prone to take prizes at the flower shows. But there are a few rare souls in whom are united all these motives and more and these live in their gardens even when absent from them. So versatile is the *Hemerocallis* now that it can satisfy in great measure all these aspirations.

It is no longer just the "yellow daylily," though you may still find people who insist that the only daylily for them must be yellow. To others the name daylily brings no answering peal from the belfry because they have known none but the tawny *Hemerocallis fulva*, ubiquitous, aggressive, extremely variable if not temperamental. At its best this common flower is wonderful, but next day, next week, next season it may be dull and uninspiring. It can not be used with assurance. It is more subject to this moodiness than any other daylily I know, more so even

than many a garden variety derived largely from it as an ancestor. The reason for this uncertainty of behavior does not seem to have been fully fathomed. Perhaps the investigative eye just hasn't yet been turned upon it with sufficient intensity. My own guess would be that it is partly response to temperature rather than a matter of brittle temperament. And why not? Since the flowers of *Hemerocallis* last normally only for a day or perhaps only for a portion of a day it follows that no two successive daily crops of bloom are produced under precisely the same conditions of sunshine or shadow, temperature, humidity, or general sequence of climatic change. The individual bloom goes through tremendous change during the last twenty-four hours, that period between advanced bud and full blown flower and all the indicated climatic variables bring their influence sharply to bear during this brief period. Most noticeable effect in yellow flowered sorts is that of size alone as the yellow color is not greatly affected, but ruddy colors are often greatly affected by low temperatures.

Contrary to the usual experience with other garden flowers, that cold heightens the color, in *Hemerocallis* the reverse prevails. Low temperature reduces strong colors but darkens or muddies delicate colors, and dulls all of them, not that this information will be of any particular help in planning the use of daylilies in the garden, but most gardeners do prefer to understand rather than merely observe and wonder.

This unhappy fluctuation in color quality of *Hemerocallis fulva*, from day

to day and from season to season, plus its weedy aggressiveness by reason of which it has spread all over the world thus making for the too close acquaintance that breeds contempt, has placed something of a stumbling-block in the way of the lovelier and more garden-useful things now pouring from the gardens of the breeders. Mention day-lilies to the uninitiate and a common response is "Yes, I know the daylilies—but don't care much for them." Then you find they know only the tawny day-lily in its semiwild state and never even thought of it as anything but a rather dull roadside weed. And they probably know, and like, the "lemon lily" of their Grandmother's garden, but never thought of it as a daylily, so prone are we to be governed by words alone.

Now we have dozens and dozens of good garden varieties of *Hemerocallis* that continue in discreet clumps for years. These are excellent garden material for the artist whether he would create his garden pictures along the line of the Hudson River School with its devotion to minute detail or performs with the great broad strokes and splashes of the Impressionists. Pigments for the picture are available in almost infinite variation from pale lemon yellow through cadmium, gold, orange to bright red, bronze, maroon and blackish purples, also numerous bicolor combinations of these. No longer are we confined to a monotony of yellow.

A few colors are not available, and probably never will be. A true white is apparently beyond the reach of the breeders, and a yellow burned white by the sun is no acceptable substitute, and of course there is no proper blue. While many of the reds advertised as such are not really red but varying degrees of brown, golden brown, red brown, and so on, nevertheless they are

often very lovely and heart warming things. On the other hand some of them are just plain dull and unsatisfactory for garden use. There are also blackish reds that tempt one to call them purples but they are not really purples either.

Crimson would seem to be beyond our reach also, but reds of the vermillion type are not only attainable but already available to some extent, but the critical prospective buyer of anything advertised as red would do well to see these novelty things in bloom before actually buying, for often the word descriptions are defective or even misleading whether intentionally or not. Buy these then on sight—unless of course you enjoy gambling and don't mind losing occasionally, for the successful garden picture depends upon intimate acquaintance and detailed knowledge of the peculiarities and possibilities of each item used. Each must be fitted into the general scheme where it can perform at all times to the greatest advantage.

If we know for instance that *Anitra* burns white in the hot sun of midafternoon we need not for this reason forego its other fine qualities if we bank it at the east of a hedge or wall where it will be shielded from the sun during the most trying hours of the day.

Suppose now we consider the ideal daylily garden, not that anyone is urged to make a garden of nothing but daylilies, but such is their variety and loveliness of color and form that many a garden might properly make them the dominant feature at least for the month of July. More than likely the garden will be viewed from the central area. Perhaps the approach will be by a central path, winding or formal as may fit the likings of the maker, or determined by the size and shape of the area under consideration, whether a confined and tiny city back yard or an ex-

pansive lawn or field. In any case a garden is likely to have its definite metes and bounds marked by hedge or wall beyond which you will know instinctively the garden does not go. Here then is the perfect setting for daylilies.

If the garden is to be a knock-out in daylily time the master gardener will keep one habit of all *Hemerocallis* well in mind, the proclivity to face its flowers always toward the strongest light. At the north of a building or northward from towering foliage masses the flowers turn their faces toward the north even though at considerable distance from the obstructions. This provides the key to the effective use of the great majority of the strong colored or particolored varieties. By and large only the complete selfs, which are mostly yellows, can be used to advantage in full open places where light is approximately equal from all directions. There the flowers will face in all directions within the same clump or bed, some facing, some turning their backs to the observer.

It will be found that most of the reds, browns, or other dark varieties, though not all of them, are decidedly two-faced after the manner of the Radiance rose, and this becomes important in planting for landscape effect.

Varieties like Harlequin, Carnival, the brown Emperor Jones, the blackish-red Vulcan, the somewhat redder San Juan darkened as with a mixture of black, the bicolor La Tulipe and many others, all carry their rich strong colors only or at least predominantly on the inside or face surfaces of the petalage, the outside or reverse often remaining plain yellow in extreme contrast with the face color. These varieties are not at all effective as seen from the rear and good garden usage demands that they be backed up against some foil sufficiently high and obstruct-

ing to light to ensure their turning all their flowers one way and toward the observer in which case they may become very showy indeed. Even the yellow varieties like *Dumortierii*, that show reddish coloration on the reverse of the petalage are better in the over all landscape effect if placed with this same consideration. The darker color seen from the rear dilutes or degrades the general mass effect.

Since all the double faced sorts are to be planted with their backs to the wall it becomes all the more important to consider their height before placement in the border so that the tallest may stand behind and look over their shorter companions. With heights varying from eighteen inches or less to five feet or more, it is now possible to build where desired an almost solid wall of daylily bloom from the ground up to eye level with great latitude for harmonious color effect within the area.

Except for propagating rows and rows of new seedlings coming into their first bloom, my own garden is almost exclusively devoted to this method of border display so that a visitor moves toward the middle of the garden and from that vantage point is greeted by hundreds of daylily blooms whichever way he may turn. He may approach more closely to examine some beauty in more intimate detail but wherever he goes within this charmed circle their faces are turned toward him as if seeking his admiration and approval. It is definitely the artist's approach to his garden.

But if the garden is diminutive, as must sometimes be the case, or if you prefer the jeweler's approach, the appreciation and enjoyment of minute perfection, you may still retain the charm of marginal planting, but instead of the central path let us say there is a belt line just comfortably inside the circle or border of daylilies. Then we

shall select not only for color and freedom of bloom but for the gem-like quality of the individual flower. Here also there is wide range for the connoisseur of loveliness. Most people are still not aware of the great variation in form provided by *Hemerocallis*. They are not only vastly variable in form and size of petal but in manner and carriage as well. Occasionally they turn up as freaks, more grotesque than beautiful, but only the breeders see these as they get culled out before the gardening public becomes aware of them.

Nearly all varieties show a certain amount of irregularity but some, like *Duchess of Windsor*, light creamy yellow with a faint but broad eye-zone and very broad petals, present almost the perfect symmetry of a fine broad petaled *Narcissus*. At the other extreme one segment, usually a petal, may be thrust out like a great mocking tongue while the other five curl back into near circles. A full sister of this may present a nearly symmetrical figure with segments not markedly recurved at all, while the mother of both, with equal symmetry, shows all six segments rolled back into almost perfect ringlets. Petals may be long and narrow and the flower correspondingly spidery, or broad and full as in *Golden Glow* and *Duchess of Windsor*. Segments may be broader in their outer portion as in *Musette*, or may taper narrowly to a point as in *Vulcan*.

Suggested by *Waubun* there is a type of bloom, regular or irregular, in which the petalage is elongated and takes on a twist as well as curl, well exemplified in *Theodore Mead*, very intriguing to an artist and in extreme cases becoming almost bizarre. So your jeweler's gem may be almost anything in form and carriage as well as color.

But form and carriage and color are not all. They vary in texture also.

The surface may be smooth or creased, crinkled or creped as in *Duchess of Windsor* or *Gipsy Lass*, ruffled margins as in the latter, or microscopically embossed to appear spangled as with gold dust. So if the jeweler's approach is yours you may indulge your fancy no end.

If your garden satisfaction demands the stimulation of co-partnership with Nature in the creation of new and possibly better things you will take the scientific approach and join the slap-happy group of amateur breeders bent on seeing what you can do that Nature didn't and perhaps shouldn't. And this may prove the greatest gardening fun of all, provided of course that you are the happy possessor of a sound mind, a healthy sense of humor, and the rare gift of unbiased judgment, a gambler at heart yet sufficiently calm and poised to turn a keenly appraising eye on your own contributions to horticulture.

The fascination of seeing something new come into bloom for the first time, something whose ancestors you have been personally responsible for, brings a thrill that is hard to match anywhere else in the whole avocation of gardening. There are so many paths to explore in this matter of breeding, so many opposing characters to work with in daylilies, desirable qualities to combine in one individual, undesirable to eliminate while retaining the desirable ones. A wonderful gamble—and no money out.

Available factors in the genus *Hemerocallis* provide for a lifetime of garden amusement. There are the tall and the short, broad petals or narrow petals, curly or straight, smooth or crinkled, and the endless variation of color and color pattern. And with a little juggling one may even mate the early with the late, with anybody's guess as to the outcome.

Among desirable qualities always worth trying for are clarity and loveliness of color, color that will not burn or fade in the sun, color that will not spot in rain, though rain damage is a minor fault since always the rain spotted flowers will be replaced by new and unspotted flowers on the morrow.

Likewise of importance is the number of flowers per stem. There is some variation of course due to growing conditions of the moment, a weak stem under crowding or poor nutrition naturally carrying fewer flowers than a strong stalk of the same variety, but altogether aside from this environmental fluctuation there is a definitely hereditary factor as well. The fine English variety, *George Yeld*, at its best in my garden has never yielded more than eleven flowers to the stalk. On the other hand my best stalk of *Cherokee Maid* produced fifty-three, nearly five times as much bloom as from *George Yeld*. These free flowering sorts require no more garden space and no more coddling or care than the inherently shy bloomers. They simply give more for less a fact lying deep at the heart of all economics.

I have said nothing as yet for the solace of the gardener who gardens for rivalry and wants to win prizes at the shows. For these there are varieties that may at their best reach a spread of eight inches as they naturally stand, to contrast with perfect little gems of less than two inches. But shows are often held at night so the ambitious prospective exhibitor will want to include some of the night-bloomers. Only a few of the daylilies remain open the whole twenty-four hours or longer, and there are others whose life is only nine hours or less. Of strictly day-bloomers, *Hemerocallis fulva* is one of the shortest lived, gets up late and goes to sleep early, is not fully awake until about nine o'clock in

the morning and begins closing by six in the evening. And a night-blooming seedling of my own scorned the sun altogether, did not open until after dusk and closed again before the dawn. But even this found acceptance in a friend's garden filling a niche near a lighted terrace where the family often sat well into the night and enjoyed its blooming.

But these are extremes. Many of our good garden varieties are fully open by daybreak and remain in good display till ten or eleven o'clock at night in no way shirking their garden service. However, if cut flowers are wanted for indoors at night you will need night-bloomers like the fine *Calypso* that opens toward evening and remains in good condition till mid-forenoon of the following day, or may use full twenty-four-hour bloomers like the old familiar lemon lily, or the *Duchess of Windsor* that lasts nearly till break of day.

Some people tend to be shy of day-lilies because the flowers are so short lived, but this is mostly a psychological phenomenon. For myself I feel that it gives the daylily garden an added charm and piquancy. Here you have half a thousand blooms today in an arrangement that will never again be duplicated. Tomorrow you will have half a thousand again, but they will be in different proportions. Here today are juxtaposed half a dozen yellows and a dozen reds or golden browns. Tomorrow the same two clumps may have reversed themselves, presenting a dozen yellows and only half that many of the stronger color, and so on endlessly, or at least to the end of the season. I think of my daylily garden as a stage where over night invisible stage hands tirelessly sweep away the preceding show and set up a completely new one for the day to come. And no two days are alike.
Chevy Chase, Md.

FOUR GARDEN SCENES

FROM THE WORKS OF

MISS ANNE BAKER

BRONXVILLE, N. Y.

Most garden pictures are built for a moment, whether that moment be extended in time or not, but in planning the Birch Walk, without a doubt there was recalled the one fine moment in winter when the effect would be of white on white, a moment as difficult as the picture planned solely in greens. (See page 206.)

A green picture for all its lilacs and tulips and promise of color to come, in the foreground beds and success or failure here depends on foliage contrast and on lines of growth. (See page 207.)

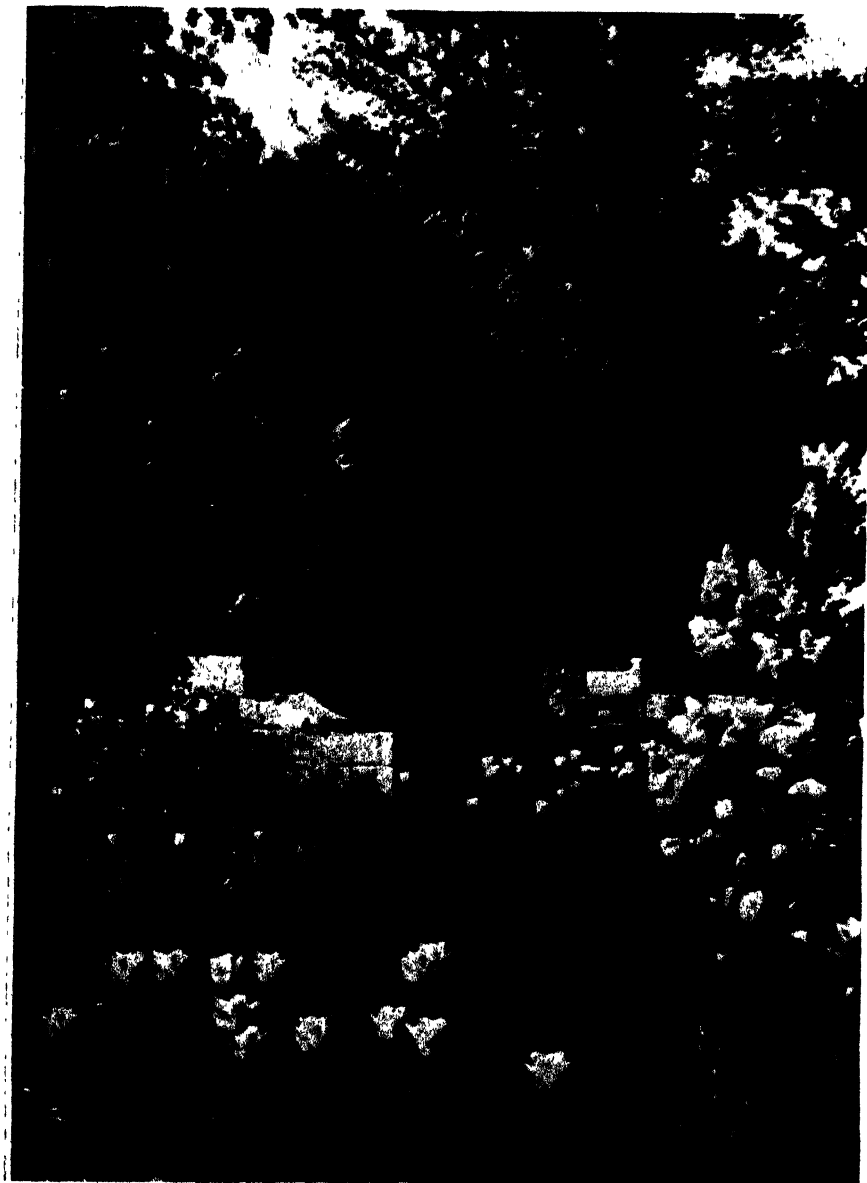
If one could divorce his sense of color from his seeing, he might realize in fact as he does in this photograph, that it is the mass of light, of broken light and of shadow that make this garden scene. (See page 208.)

Here one feels masses and to accentuate as well as to bring contrast, the roughly surfaced stone is perhaps better than anything else, stone almost of the character that might be found in nature, in the field near by and not set free from the encroaching plant growth that crowds in, as in any hedgerow. (See page 209.)

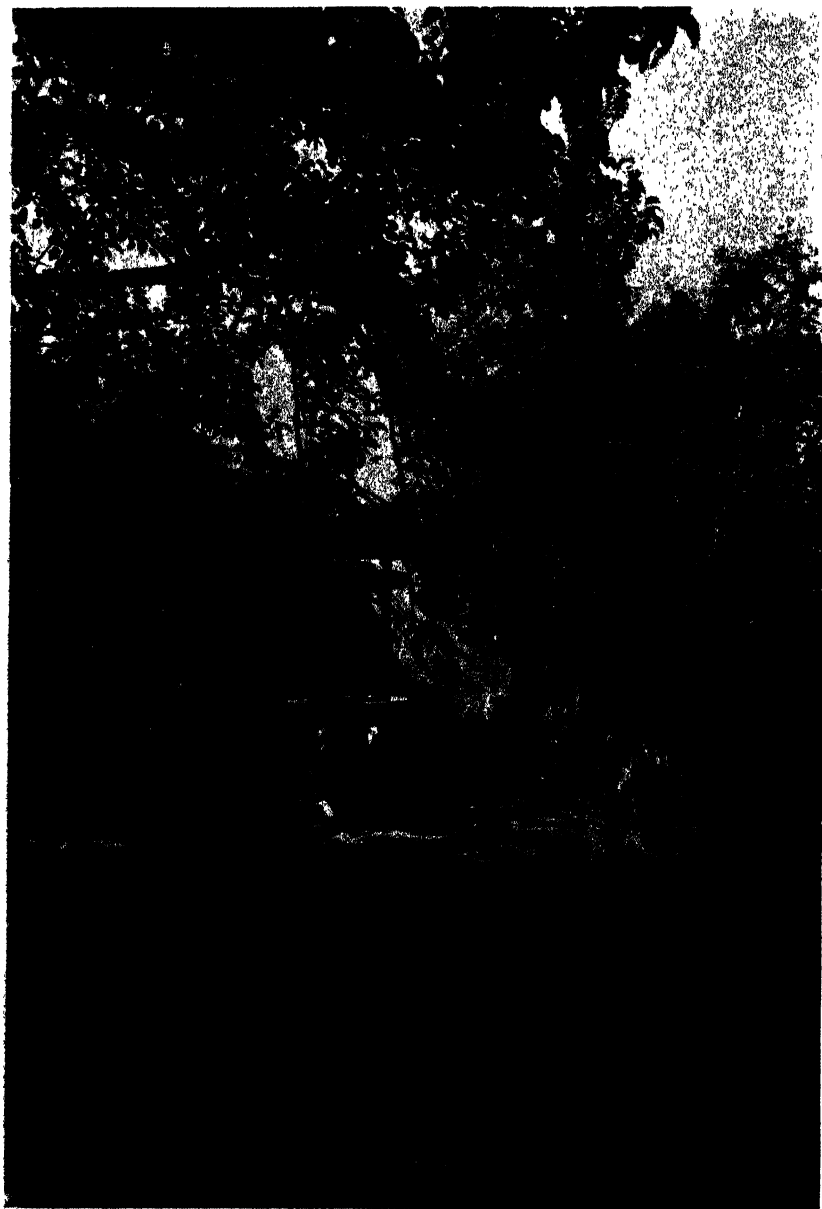


Walter B. Wilder

"... when the effect would be of white on white. . . ."



"A green picture for all its lilacs and tulips"



" . . . of light, of broken light and of shadow. . . . "



"... encroaching plant growth that crowds in. . . ."

Winter Gardening at Cushing General Hospital

KATHRYN S. TAYLOR

Of all the arts and skills which are being used in the rehabilitation of service men in Army and Navy hospitals, gardening is among the most effective though difficult to put upon a satisfactory working basis. The chief reason for this is that the daily routine of the average patient does not allow him to give plants the rather constant attention over a continued period of time which they require. In a skill like rug-making, the rug does not suffer in the long intervals when it remains untouched. Plants cannot shift for themselves during similar periods, and this fact must be recognized when any sort of garden project is under consideration for a hospital. This is particularly true when a winter garden project is suggested, and commanding officers should not be encouraged to accept the gift of a regulation type of greenhouse, if to be used exclusively by patients, unless the responsibility entailed is fully understood.

The sun-heated pit is one type of greenhouse, however, which can survive periods of enforced neglect and still present a creditable appearance. That at Cushing General Hospital in Framingham, Massachusetts, is a recent gift of the Garden Club of America and it demonstrates this fact very well. It is attached to an occupational therapy workshop and is used by patients, some of whom are not well enough to go out-of-doors. The behavior of this pit, and the contrast between it and one not attached to another building, should be of interest to many gardeners who would also have a winter garden if they could be assured that they need not always have someone on hand to care for it.

It might be well to explain briefly what is meant by a sun-heated pit. The excavation for a pit greenhouse extends from 3 to 4 feet below ground depending upon the amount of drainage required. The excavation is lined with a cement wall or hollow tiles. The pit faces due south, and that side of the structure above ground is made of 3 by 6 foot hot bed sashes slanted at an angle of 45°. The north side is a shingled roof. This side and both ends have double walls with insulation in between. Doors and other openings for summer ventilation are also insulated. The glass is covered with quilted pads and straw mats at night. It is uncovered after the sun comes up in the morning and covered again before the sun sets in the afternoon. On cloudy days nothing is done except to turn on electric lights inside. There is no other source of heat unless the temperature goes well below zero. Then, nothing more powerful than the heating unit of an electric sunbowl will furnish protection. The approximate temperature (night) of an unattached pit in severe weather is 33° to 35° F. If it is attached to a building, it is usually about ten degrees higher. A very small amount of heat will raise the temperature in the former to 40° F., which is what many plants prefer. The width of the pit is fixed by the angle of the glass to about eight feet. The length depends upon the number of hot bed sashes used. There is eight feet of head room under the ridge. A bench for plants along the south side of the pit is just below ground level, and a 3-step staging along the north wall allows room for tall plants like camellias and azaleas.

The sun-heated pit at Cushing is 22 feet long. Although during the winter months such structures are intended to be worked in only in sunny weather, the patients here work almost every day. Since there is no sun to furnish heat in cloudy weather, a small radiator has been fastened to one wall. It is used only when the men are there. Patients work for an hour and a half in the morning and usually for another hour or so in the afternoon. The rest of the day, and on week-ends, the pit has largely to shift for itself. The fact that it can do so without serious harm coming to the plants is thoroughly appreciated by the Army officers who have it under their jurisdiction. A description of what happened to the pit over the recent Christmas holidays well illustrates this important point. All patients connected with the project had 10-day leave, and the corpsmen who uncover the glass and help with the ventilation were also absent over the holiday week-end. The pit remained covered for a period of three days, and a sergeant looked in but once to see that all was in order. Six of the seven sashes were covered with three 6 x 6 foot thin quilted pads. Although three 6 x 6 foot straw mats were available to give further protection, they were not used, and the seventh sash was never covered at all. The insulated door at one end, being new, had swelled so that it would not shut tightly and it had not yet been planed down. The heat was turned off and the door into the workshop was closed. In spite of all these disadvantages, and although the temperature outside descended close to zero during this period, the inside temperature went no lower than 39° F. This was a surprise to everyone concerned and proves the value of this type of house in the present crisis when fuel cannot be spared for greenhouses. The

plants were all in good shape and did not object to being in darkness for several days. They were watered twice in the ten days while the patients were away. It would have been difficult, if not impossible, to find anyone to give much attention to the pit during the holiday season, and if a regulation greenhouse had been given to Cushing the plants would certainly have been dead if like treatment had been advised.

Only those patients who want to work in the pit are asked to do so. Usually they know little about gardening at the start, and often, just as they acquire the knack, they become well enough to be discharged from the hospital. Consequently, every few weeks a new group of patients takes over who must be taught from the beginning. The plants are therefore frequently subjected to adverse treatment, and it is stimulating to find ways to guard against as many accidents as possible. On one cold day, a corpsman who noticed the temperature in the pit approaching 90° opened one of the sashes right beside the plants and left it so for an hour. The icy draught blowing directly on the tender growth of snapdragon and oxalis nipped a goodly number of shoots beyond repair. To obviate such happenings, "do not" signs such as "do not open this window," "do not water this plant," etc., are placed at strategic points and have helped greatly. There is a maximum and minimum thermometer in the pit, and its readings are recorded every morning. The lowest temperature so far was 36° F., and the highest 96° F. The average night temperature is 44° F., and the average day temperature is between 65 and 70° F. A chart is kept of when plants are sprayed and fertilized. Liquid cow manure and Electra are used alternately. The only complete failures so far experienced

were coleus plants in water tight pots. Being watered as frequently, by one beginner after another, as plants in porous pots, the water actually stood on top of the soil most of the time. The coleus soon succumbed and their place has been taken by more worthy subjects.

All of the plants in the pit have been donated by generous friends. Many of them were purposely in the seedling stage to provide work for the patients in bringing them to the flowering point. Some fine chrysanthemums in pots were provided for immediate effect, however. The boys have carried the seedlings on surprisingly well and visitors are truly impressed. Plants which require cool conditions were chosen for the pit, but a greater variety could be grown here because of the extra warmth furnished by the pit's location and the presence of the small radiator.

Many seedlings came from a detached pit only a few miles away, and their response to the different conditions in the two pits is interesting. *Primula malacoides* is in full bloom in the warmer pit and just showing color in the cooler one. Winter-flowering forget-me-nots and violets are in full bloom, and do better in the colder pit. They blossom, but are not so sturdy in the other. They have not blossomed any sooner, even with more heat (It is now early in January). Annuals, like schizanthus, are a little too cold in the detached pit and do much better with some heat. Camellias blossom a bit earlier in the warmer pit. While many plants like geraniums are resting in the colder pit, all such plants are

making growth in the other. A plant of *Cypripedium insigne* has a flower in good condition after being in bloom for thirteen weeks. This seems a fine record for amateurs to achieve.

When the Garden Club of America gave the sun-heated pit to Cushing, the writer's services were included in the arrangement to see that the project got off to a good start. She spends two mornings a week with the patients, and this relieves the Army officers and the Occupational Therapist of responsibility which might otherwise become too much of a burden in their over-busy lives. The patients enjoy the pit more when not left entirely to themselves and their individual interests are noted and catered to as much as possible. They are taught the routine care of plants, as well as seasonal activities like the making of winter cuttings.

Gardening with men returned from the world's battle fronts is a privilege not to be taken lightly. All of them are heroes who are extremely modest about their accomplishments. Often, before they leave the hospital, they voluntarily speak of the effect their experiences have had upon them and express gratitude for the opportunity of working among the flowers. They insist that the pit has been of inestimable value to them in their struggle back to health. This is not hard to believe because the improvement shown is obvious. Several are planning to build pits when they return home. Surely no other reward is needed for one's efforts and it is a great source of satisfaction to have this small part in the big task of rehabilitation.

The Beginning of Pecan Growing as an Orchard Industry

CLARENCE A. REED

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U. S. Department of Agriculture*

Pecan growing as an orchard industry upon a varietal basis was born in 1846 or 1847, when the first trees of that species were grafted. In 1876 this grafted variety was named Centennial. The grafting operation was performed by a slave gardener named Antoine (pronounced An-twan) on Oak Alley Plantation, which faced the Mississippi River from that part of St. James Parish, La., which is on the west side of the river. The parent tree from which the scions were obtained then stood in Anita Plantation of the same Parish but on the east side of the river. It was destroyed in 1890 by a disastrous crevasse which swept away not only the tree but also the soil to a depth of 15 feet.

Altogether 16 trees were successfully grafted by the slave during the first winter. This number became 126 within the next two decades with the grafting of 110 more trees in a pasture on the same plantation "40 arpents" from the mansion. Following the close of the Civil War (1865) all but two of the grafted trees were cut down by a new owner of the plantation in order to make room for sugar cane. As the two trees allowed to remain stood on the mansion grounds, it is reasonable to assume that they were among the very first to be grafted. The better of the two was photographed in October 1902 by William A. Taylor, then a pomologist in the Bureau of Plant Industry, U. S. Department of

Agriculture, by whom these historical data were ferreted out at that time. The full account as written by him was published in the Department of Agriculture Yearbook for 1904 (pages 407-408).

According to Taylor's account, the first grafting of the Centennial variety for the purpose of selling the trees was done by William Nelson in 1882 in the nursery of Richard Frotscher, of New Orleans, and these nursery trees were first catalogued by Mr. Frotscher in 1885. Data subsequently obtained by the present writer showed that the variety was planted widely, in some cases on a large scale, between that time and about 1905 when its propagation practically ceased because of its pronounced habit of light bearing and the development of other more fruitful kinds.

An enlargement of the picture taken by Taylor was made in 1913 and hung on his office wall soon after he became Bureau Chief. It remained there until his retirement in January 1934. A copy of the picture made from his original negative is shown in Figure 1. On Pearl Harbor Day, December 7, 1941, or 39 years and 2 months after Taylor's visit, the writer visited Oak Alley Plantation and took several photographs. One of these, shown in Figure 2, is believed to be the same as the one photographed by Taylor.

It is of interest that the plantation



C. A. Reed

The Centennial Pecan



C. A. Reed

It is to this avenue of 28 giant live oaks, 14 on a side, that Oak Alley Plantation owes its name. These trees, together with the presence nearby of two of the first pecan trees ever grafted, give the place unusual historical interest and charm.

made notable by its pecan trees owes its name to a magnificent avenue of 28 live oak trees, 14 on a side, that beautify the walk leading from the mansion to the highway and the Mississippi River levee directly in front. While there is no exact record as to when these trees were planted, it is assumed by Mr. S.

Stewart, who lives on the plantation and operates its 2,000 acres of sugar cane land, that they are now about 118 years old, as the mansion was built between 1830 and 1835, and it is reasonable to suppose that the avenue dates from about the same time. A view of the avenue is shown above.

ROCK GARDEN NOTES

ROBERT C. MONCURE, *Editor*

An Alpine Columbine

Aquilegia pubescens is one of those plants to be found only in well-favored places, remote and majestic places where huge gorges separate tall mountains and glaciers have piled up moraines of granite chunks; where the prospect transmits exultation, for its relentlessness is tempered by the gentle beauty of delicate flowers. Contrasts are strong—there is magnitude and finiteness and the elements show themselves indulgent and kind or savagely cruel. Tiny plants come out of the cracks in immense boulders, rosy finches, themselves wee specks on vast snowbanks, peck about for minute seeds, and out of a jagged groundwork of rocks in Bloody Canyon, *Aquilegia pubescens* makes a dainty fringe of pastel colors above its fernlike thread of small, pale gray leaves.

The flowers are large. They may be pure white or cream, pale pink or pale blue, light yellow or light lavender. There is often a hint of columbine red at the bases of the long spurs and the buds are sometimes flushed with a wine-red which disappears as the flowers unfold, remaining inconspicuous on the sepal reverses. This alpine aquilegia carries all the shades of the modern hybrid garden columbine and there is quite as much variety in the coloring. At 12,000 feet altitude, alongside *Polemonium confertum*, it is only a few inches tall. At 9,000 feet, which is about as far down as it comes, the flower stalk may be a foot long.

It looks just what it is—a wild plant satisfied and serene in its chosen place. I'm not sure that I should like to see it grown in the garden along with formal bedding plants and I doubt that

it would be happy there. (Please don't write to me for seed for though I have plenty, it must by now be quite infertile, for gas rationing has clipped my wings.) It is impossible to transplant even very young specimens of this columbine for the long roots are securely anchored in the cool moist humus and gravel which have lodged in crevices between jumbled rocks. Sometimes it grows in almost pure stands; in other places its associates may be *Primula suffrutescens* or *Eriogon albidus*; and along rocky margins of alpine lakes it may join forces with *Cassiope mertensiana* and *artemisias*. It is found with drabas and with *Erysimum perenne* and, in the southern end of its rather limited Sierran area, with *Leptodactylon Nuttallii*.

Deer, the curse of the seed collector, are so fond of the crisp half-ripe seed pods that mature seed is difficult to bag. But even though one comes away seedless, the contemplation of this columbine and its choice companions is worth the long hard climb.

LESTER ROWNTREE,
Carmel, Calif.

Some Like It Cold

Scant sympathy is given the north slopes of our Rock Gardens since so many rock plants are sun lovers.

Yet in regions of much sunshine some of the high alpine and some that come from sunless climates, prefer a north slope and perhaps dappled shade. Too wet? A self respecting rock garden can't stay wet. Isn't it built on porous stuff?

It may be that we Rock Gardeners need a "credo" to keep us always reminded that the first Rock Gardens



Fraser's, Inc.

[See page 216]

Aquilegia pubescens

were made to simulate the lovely screes of the Alps in all their wealth of bloom; not, mind you, to imitate the appearance of rocks but to give these alpine plants the root conditions most nearly like those in their high home; porous drainage to carry off excess water, rocks to maintain equable temperature, and both to provide a cool root run, were first necessities. Then were added pockets of peatmoss or soil in the case of plants which ask for more food or less immediate dispersal of water.

Forty years ago, before the age of the geological-museum variety of rock garden or the sidewalk monstrosity, before people ever thought of making a Rock Garden because "nothing else will grow in that corner" precious plants themselves were the center of attention, love and care. We brought back these treasured plants from the Alps and our whole aim was to make them feel at home in the moist and muggy air of England—hence the rocks and scree. Those who begin at the end and work backwards may miss the whole thing. Haven't we seen great labor and expense spent on making a rock garden before there was a glimmer of imagination about the plants that were to make their home in it?

Pardon all this digression. We were attending to that bare north slope. In regions of much sunshine and perhaps of insufficient winter snow, here are some friends that will thank us for a north exposure: Snowdrops, Crocus, Chionodoxas, Miniature Daffodils, most of the Primulas, dwarf Trollius, Hepaticas, dwarf Mertensias, Boykinia, several Saxifragas, especially *S. austromontana*, in fact most plants that have retreated to the cold regions above timberline will prefer to face northwards even though they may tolerate a hot sunny place in their determination to hold on to life. Failure after

failure hit me every time and everywhere I planted Aubretia until now there's a lovely green fleece of it, full of buds, two feet away from the north wall of a cement garage. Here the sun doesn't touch it all winter and in the summer only near the times of sunrise and sunset.

In this same rock garden sloping north at an average 45° angle are other things happy now after looking miserable in unkind places. *Primula marginata* loves it. *Aquilegia saximontana* grows into big clumps as gaily as on the high scree slopes of Pike's Peak. *Primula angustifolia* has lost the pinched look it had in a garden of half-day sun. *Phlox multiflora* becomes positively buxom. Last and loveliest, *Calypso bulbosa* is spreading its distinctive leaves flat over a little larger space each year, its little pink slippers looking so poised and ready for the fairies. Next, Fantasia-in-the-making we must show them to Messers. Disney and Stokowski.

Cement wall? Yes, that's bad, but *Euonymus kewensis* and *Euonymus radicans colorata* are doing their best with it.

After all, this country is so huge and affords such wide contrasts in gardening conditions—climate, soil, altitude—a north slope in my garden may be cool while in yours it's hot as blazes all summer. Wouldn't it be of real value if in telling how we grow this or that we would each give our maximum and minimum temperatures, altitudes, average days a year of sunshine, and average rainfall? Or at least say whether the scene of the crime is in Kentucky, Kansas or Kodiak.

For a gulp of our own medicine, above growing pains are experienced on the east slope of the Rockies in Colorado, 6,000 ft. elevation, high summer temperature 95°, low winter—25°,



Kathleen Marriage

Phlox multiflora
Primula angustifolia

humidity 25, rainfall 13 inches, sunshine 360 days.

In the South Rock Garden there are plants which love to cook in the sun, but that's another story.

KATHLEEN MARRIAGE,

Colorado Springs, Colo.

A Choice Little Cactus

Not all cactus, even of the smaller varieties, are suitable for the rock garden; however, that is a treasure in the Kansas plains that is a treasure in the high, dry section of even the most exclusive rock garden. (*Mammillaria* sp.)

The start is a tiny grey cushion, often not more than a half inch across. The result is a mound sometimes a foot high and two through, of these wee individuals so tightly compressed they look like one solid mass. This mound, at all stages of its development, comes down snugly on the ground, or the rock, against which it may be growing.

Completely covering the mounds are the wealth of lovely amber flowers, which shade to a deeper tone in the throat. This display lasts a satisfying length of time, for the blooms open and close and open again for days, before falling to make way for newer buds. The tiny button of a cactus starts right in at its blooming job as soon as it decides it is happy in its location. We had tucked a single plant into a small hole in a rock along one of the walk borders and forgot it. I had even moved the rock without noticing it. Then this summer we saw some amber blooms apparently coming directly from a rock. Looking closer, there was the little cactus-button that had increased to three and was crowded with bloom.

The berries that follow are bright scarlet, about the size of coffee berries, and stand on end in the hollows under the flat-lying, lacy white thorns. These

glow all winter, lasting until next season's flower buds push them out. A fine mound of this cactus is a treasure in the winter garden, making a lovely picture when the garden is covered with snow, as it melts about them quicker, leaving them very prominent in their white bed. The grey mound studded with scarlet berries, overlaid with lacy white thorns. Who could ask for a lovelier thing?

One mound in our rock garden measures ten inches tall, by fourteen broad; and has conformed to the shape of the rock beside which it is growing. All other edges fit down tight to the ground. I have no idea of the number of individuals in this plant nor its age, for it was a good size when we found it. Judging by the slow growth of the young plants it must be a patriarch. Another large one is doing its increasing more on the horizontal, but still rising several inches.

Their only requirements here seem to be a sweet soil, sun and perfect drainage. I accomplished this by adding lime to the soil and excavating a shallow hole which I filled with rocks about the size of my fist, and piled the earth on top, making a little knoll, on which I set the grey mounds and smaller ones of the colony. They have made themselves right at home and are doing as well as on their native prairie.

ALBERTA MAGERS,

Mountain Home, Ark.

A Northland Beauty

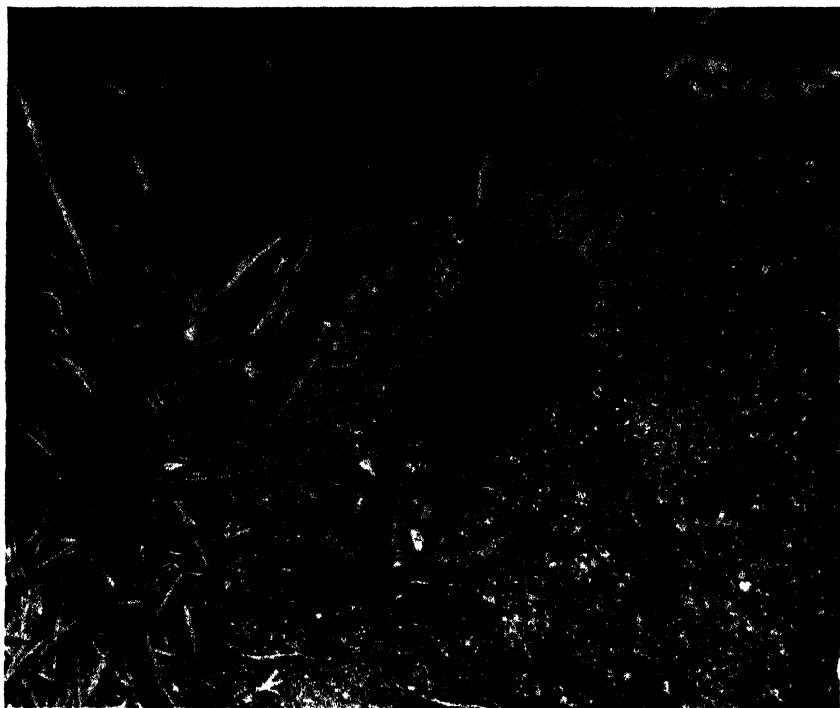
The Arctic Bellflower is no illusion! Its flowers really are that large. And its color is truly a clear, light lavender-blue. So my thoughts ran as I saw *Campanula lasiocarpa* for the first time. I had read about this northland beauty growing in the Canadian Rockies but had hardly expected to find it as far south as Shovel Pass in Jasper National Park, Alberta.



Kathleen Marriage

[See page 218]

Calypso bulbosa



Warren C. Wilson

The Arctic Bellflower, Campanula lasiocarpa.

The plants grew by the hundreds in the Arctic-alpine Zone. Although "rugged individualists," their huge bells scattered over the grassy slopes and in the rocks made a striking display. Each flower was fully an inch and a half long. The stem was an inch in length and the rosettes of shiny, toothed leaves a half inch in height. A silver dollar could have covered a whole plant!

The range and history of the Arctic Bellflower are interesting. It now occurs in western North America, chiefly Alaska, and northeastern Asia. According to an eminent plant historian, this species probably occupied large areas of northern North America from coast to coast before the last great glaciation. During the glacial period

all the plants were exterminated except those finding refuge in relatively small areas in Alaska and eastern Asia free from the ice sheet. The vigor of the species was greatly reduced by its long struggle for existence during this period. Hence, after the retreat of the ice, it has spread over only a small portion of its former domain.

Those of you with rock gardens are probably wondering why *Campanula lasiocarpa* is not common in cultivation. Unfortunately, it is very difficult to grow. Some English and Japanese catalogues list it and occasionally an American nursery offers it. Apparently Asia was the original source of these plants. They are less desirable than the plants I have described because of

their smaller flowers and longer stems. This may be the reaction of this alpine to cultivation at low elevations; it is typical of many. If you try to grow the Arctic Bellflower, I suggest a rather heavy soil (neutral in reaction) with

some stone chips and peat moss added and a protected situation, to the north or east of a large rock or in light shade. Its natural habitat indicates these requirements.

WARREN C. WILSON.

RHODODENDRON NOTES

CLEMENT GRAY BOWERS, *Editor*

Rhododendrons in Kansas

In spite of the accepted idea that rhododendrons, azaleas, kalmia and associated plants cannot be grown successfully in the mid-west, the writer has not found them difficult garden subjects. The generally recommended method of planting—digging a hole twice the size of the ball, placing the plant therein and filling the remaining space with a peat soil mixture—is not at all satisfactory. No matter how much care is taken, the roots never seem to leave the root ball and the plants usually dwindle and die within a year after they are planted.

The following system has worked very, very satisfactorily here in eastern Kansas. The soil on the site is excavated to a depth of 15", and the excavation is filled with sawdust to a level 8" higher than the surrounding soil level. Oak sawdust is much to be preferred but if it is not available, soft wood sawdust may be used though it is advisable to acidify the sawdust in that case with a light coating of sulphur. Beds are best made in the fall before the planting is to be made so that the beds may settle and the sawdust start decomposing during the winter. This is not absolutely necessary, however.

Balled plants are not planted in this mixture as received. Instead the balls are held in holes excavated in the beds at about the right level, then the balled

soil is washed off the roots while at the same time sawdust mixture is pressed lightly around the exposed roots. Plants are not set back by this drastic treatment; frequently late planted rhododendrons will show growth within ten days after being handled as above. Here, at least, a proper soil mixture is by far the most important factor in the successful growth of these plants.

About March 1st, when the first signs of growth appear in the spring, a light dose of fertilizer is given these plants, with a final heavy application not later than June 1st. Two foot plants are given about a pound with larger or smaller plants given greater or lesser amounts in proportion. The fertilizer used is made up as follows; cottonseed meal 5 parts, sulphur 1 part, 40% superphosphate 5 parts, ammonium sulphate 2 parts, potassium phosphate 4 parts. Plants are mulched with about an inch of sawdust every fall, and a light fence made up of corn stalks fastened together with wire is placed on the north side of the plants to lessen the effects of north winds.

Part of the rhododendrons are planted north of a house, the rest in a lath house. The azaleas are planted on the east side of a house or out in the open with no shade whatsoever. These rhododendrons have endured extremes of from minus 16 degrees, the second lowest temperature ever recorded here,

to a high of slightly in excess of 100 degrees, with no injury from summer sun but slight bud injury to a few from these low temperatures. Twelve different varieties of hybrid rhododendrons are included in these plantings and twenty-eight different varieties of azaleas, with a total of about 250 plants.

All of these plants are thriving—not merely existing, and I am convinced that the area in which they could be grown would be extended considerably if these suggestions with reference to soil preparation were followed.

The same suggestions apply to *kalmia*, *leucothoe* and *vaccinium*, all of which are doing well with me planted in the same soil. Very occasional waterings are given the plantings, though I make an effort to give them a heavy watering after the first hard fall freeze. This soil mixture absorbs an enormous amount of moisture, no rain water runs off the beds and it is rarely necessary to water the plants more than once or twice during the summer.

HARRY V. SEEVERS,
Ottawa, Kans.

Rhododendron mucronatum f. *sekidera*
Wils. and Its Kin. (See page 225)

Under this very formidable name one must look for a very pleasant garden shrub that should be much more commonly planted than it is. This is the form of the familiar large white-flowered azalea that is often found in catalogues under the names of *Azalea indica alba* and/or *A. ledifolia*. In the case of the plant illustrated one must add the word *magnifica* to the above. At times it appears in trade under the name of Damask Rose.

If one consults Rehder and Wilson's "The Azaleas of the World" page 72, he will find other names that have undoubtedly appeared in the trade and see the reason for the adoption of this particular name for use in the botani-

cal world. One will also learn by implication that there are several clones of this plant in cultivation not all of equal value. Of those seen by the writer, the only or chief variation appeared to be in the deepness of the rose red in the blotch on the upper lobes. Quoting from Wilson (l.c.): "the flowers are as large as those of the f. *No-ordtianum*, pure white with the dorsal lobes spotted and splashed with rose, occasionally a flower is rose colored; the stamens vary from 6 to 10 but are usually 10." What Dr. Wilson did not mention is that sometimes this plant also throws parti-colored or even striped flowers, a factor which may have some historical value in considering some of the sources of variegated flowers in the past.

It is unfortunate that the same enthusiasm which has attended the rapid propagation and dispersal of the Kurume azaleas and has brought them even to ten-cent store sales within the last few years, has not come as far as this plant and the other cultivated clones that belong to the species. The probable reason is that a Kurume cutting forms a small flowering bush much more quickly than this, since there is no difficulty in rooting cuttings of this particular plant, nor the type. As always in this group, cutting should be taken from wood of the current year's growth, as soon as this is half ripe; that is, neither brittle enough to snap, nor soft enough to bend like rubber. Cuttings in both these extreme conditions can be made to root, but in the first case the process is slow and in the second tedious, since one must give constant attention to prevent wilting.

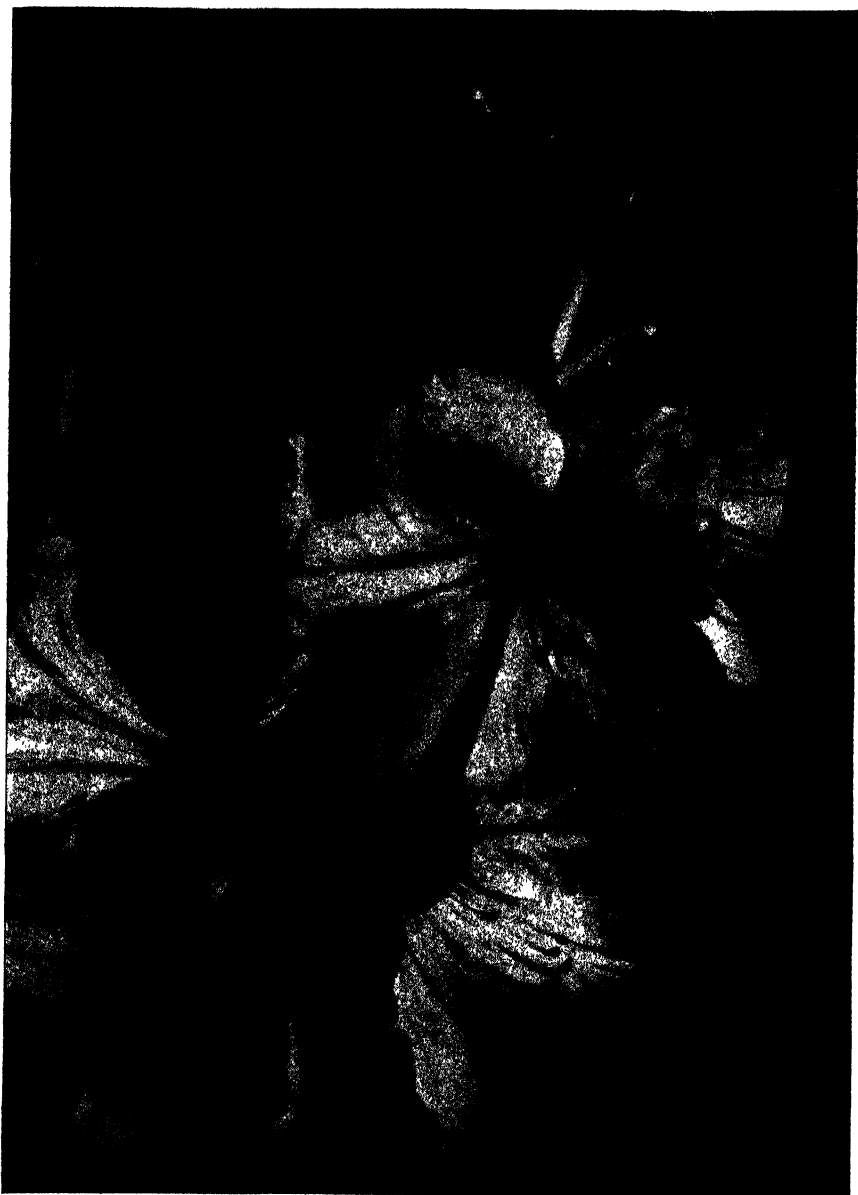
The plant grows almost exactly like white flowered type but occasionally is or seems a little more open in its growth. Like the white type it sheds part of its foliage in the winter so that in the latitude of Washington, D. C.,



Robert L. Taylor

[See page 224]

Rhododendron mucronatum f. *skidera* $\frac{3}{4}$ natural size.



Robert L. Taylor

[See page 227]

A Simsii × *mucronatum* hybrid.

it is only semi-evergreen. Growth starts quickly in the Spring but does not obscure the flowering.

The only cultivated plants which the writer has seen, which would appear to come under Wilson's *R. mucronatum* f. *amethystinum* if one may depend upon the color description, are not intermediate save in coloring; all have much smaller flowers and the corolla lobes are so much narrower than the others that the flowers appear starry. In the local gardens this form flowers two weeks ahead of the others.

No description is given for the plant grown in nurseries here as *lilacina* which is the pale pinkish lilac counterpart of the type. Whether this is a clone developed from the sporting branches of the subject of this note or is derived from some other source is not known. The only plants which the writer has seen, supposedly *R. mucronatum* var. *ripense* Wils., were raised from seed and obviously were not true since they exhibited a wide range of color including degrees of rose and pink which were too far removed from the lavender pink tone of the usual variations. They were definitely tender in the same climate. This is regrettable since they were lovely flowers of astonishing size. It may be noted that Wilson (l.c. page 73) says "I have examined the type of Makino's *R. ripense* and can find no character by which it differs from *R. mucronatum* G. Don

except in the rose-purple color of its flowers, and as is well known a branch bearing colored flowers is often found in Don's species. (Italics mine, Aut.) Many hundred plants of the white-flowered type have passed through the writer's hands, but doubtless from not more than four clones, but never has a single flower been noted that was not entirely white.

It may easily be that much more work should be done with this group of plants not only in the raising of hybrids but the raising of seedlings from selfed flowers.

The writer has used it in various crosses, one of the earliest of which was with pollen of the white form on *Kampferi*. The results were a series of plants much like *Kampferi* in general growth habits but with larger flowers not one of which exhibited the least suggestion of *Kampferi* color save at the very base of the corolla where a faint stain of salmony orange showed above the lilac pinks. None has been saved. In crosses with *Simsii* varieties some very charming garden plants have resulted, one of which is shown, and it seems not impossible that with some care in the program, one might evolve a race of "Indian azaleas" using that term in the old loose sense, which would be useful at least in the Middle Atlantic States if not in either North or South.

B. Y. M.

LILY NOTES

GEORGE L. SLATE, *Editor*

Minor Species of Asiatic Lilies

Eastern Asia and the adjacent islands are regions of great interest to the cultivators of lilies, for here are found more than half of the known species of *Lilium*. China and Japan are the headquarters of the genus, but in India, Burma and northeastern Asia several species are indigenous. *L. dauricum* is found as far north as 55° N latitude in Kamchatka while far to the south at 11° N latitude in the Nilgiri hills of southern India is found *L. neilgherrense*, separated from other lilies by the hot dry plains of central India. No other region of the world is so well-endowed with lilies.

The numbers, the beauty and the potentialities as garden plants of the Asiatic lilies inspired E. H. Wilson to monograph them in "The Lilies of Eastern Asia." Forty-seven species and many varieties were described. In the hands of hybridizers these species are producing many handsome new varieties, some of which excel their parents in beauty. New colors, new forms and greater adaptability to garden conditions may be found in the hybrids raised in recent years.

The Asiatic lilies are generally a handsome lot. *L. auratum*, *speciosum*, *regale*, *Sargentiac*, *myriophyllum*, *Brownii*, *colchesteri* and *formosanum* are among the most beautiful, but many others would rate an honored position in any garden. Several are well-known and popular garden plants and may be found in the catalogs of many firms. Many do well in gardens and only a few are difficult. Except for the lilies of southern Asia most species are hardy, although in some cases it may be difficult to determine the true win-

ter hardiness of a species since its disappearance over winter may well be due to basal rot rather than low temperature.

Many hybrids have been produced between the different species and in several cases the parents are rather diverse. Hybrids with the European and American lilies are few and only two are of importance. The upright-flowered descendants of *L. concolor* and *L. dauricum* have been crossed with *L. philadelphicum andinum* and several varieties from this line of breeding are now in the trade. *L. Hansonii* and *L. Martagon* have been crossed with excellent results and their progeny of the first and second generations are now growing in gardens.

This discussion is concerned chiefly with the lesser known species and variants of the more important species. At one time or another nearly all of the available species have been tried except the tender species from India which are poor travellers and arrive in very poor condition. With some experience is rather meager, with others considerable experience in propagation and breeding has been obtained.

The section *Cardiocrinum* consists of *L. giganteum*, *L. cordatum* (*cordifolium*) and *L. cathayanum*, all similar, and so different from other lilies that one not familiar with the genus is surprised to learn that they are lilies. The most striking characteristics are the large broad heart-shaped long-stemmed leaves. The flowers are funnel-shaped and horizontal. The plants take several years to reach flowering age, bloom once, bear a heavy crop of seeds and then die, leaving behind a few bulb-lets on the base of the stem to perpetu-

ate the plant. It is rather surprising to dig up the plant in the fall after the seed crop is ripe and find that the old bulb has vanished completely.

L. giganteum is well-known to lily fanciers in England where it is not regarded as difficult and many excellent specimens have been grown. In this country it is rarely seen. Only one plant has flowered and this attained a height of five feet. Another bulb planted at the same time failed to flower. Offsets from the flowering bulb have grown on, but are not especially happy, presumably owing to a lack of suitable shade and the competition of a large tree nearby. Apparently much more water is necessary than was applied. The plants are mulched with sawdust with additional straw for the winter. No plants have died over winter, indicating that the species is probably winter hardy under conditions obtaining at Geneva, N. Y. Several lots of seed have been planted, but very few have grown and less than a dozen seedlings have reached the flowering stage. Suitable conditions for this lily include a lime-free rather sandy soil well-filled with leaf mold. The shade of tall trees far enough away to eliminate root competition, a mulch of peat and plenty of moisture in dry seasons would complete the specifications.

A single specimen not well-grown is not handsome, but a colony of several plants eight to ten feet in height would be a worth-while addition to any garden. The flowers are seven or eight inches long, ten or more in number, white tinged with green on the outside, and white striped and splashed with reddish purple within. The large stem is hollow and clothed with large, glossy green broadly ovate leaves which form a rosette at the base with the stem leaves alternate and scattered.

L. giganteum is a native of the Himalayan region from Garhwal to

Sikkim and in Nepal in the Khasia hills where it grows in the shade in very moist loam well-supplied with leaf mold.

To flower well it must be well-established for a year or two. The smaller sized bulbs should be planted to grow on to flower a year or two later. Shallow planting with the top of the bulb just below the level of the soil is advised. This necessitates thorough mulching during the growing season and winter, and free use of the hose if the weather is at all dry. Chemical fertilizers have been used with no sign of injury and possibly with benefit.

L. cordatum is a poor relative of *L. giganteum* and is not worth growing except as a curiosity. Two or three seedlings have been raised to flowering size which stage is reached sooner than with *L. giganteum*. It grows about five feet high and bears six or more creamy white narrow funnel-shaped flowers splashed with reddish purple on the inside. Presumably its cultural requirements are similar to *L. giganteum*. The plants have had cheesecloth shade, a loam soil to which peat was added, and a thick mulch of sawdust. Commercial fertilizer has been used, but no watering has been done. The species is found in Japan where it grows in cool moist situations in soils rich in organic matter.

L. cathayanum is no prettier than *L. cordatum*, but seedlings, of which two or three dozen have been grown, reach flowering size a year or two sooner. It has grown freely under the same cultural conditions provided for *L. cordatum*. The seedlings vary considerably in vigor and the color of the foliage in the spring. The color of the leaves varies from reddish to greenish and during the period of rapid growth in the spring the plants are attractive. The flowers are narrowly funnel-

shaped, greenish white outside and splashed with reddish brown on the inside. Visitors always pause and exclaim when passing this species, but one would scarcely care to grow it for this purpose alone since it is lacking in ornamental value. Thus far the plants have been winter hardy and apparently not difficult to grow.

L. cathayanum is a native of central and eastern China being found in dense woods along the banks of mountain streams.

The *Leucolirion* section of the genus includes the lilies with trumpet or funnel-shaped flowers. Some of the handsomest and most striking lily species belong here. *L. regale*, *formosanum* and *longiflorum* are too well-known to be included here.

L. philippinense, a native of the islands whose name it bears, grows wild in the mountains of northern Luzon in rocky places in poor light soils among trees, shrubs and herbaceous plants. It is rare in cultivation in the United States, no doubt because of its tropical nature. Plants which were raised from seeds procured from the Philippines have been grown in 12-inch pots which are kept in the cloth house in the summer and in the fruit cellar in the winter. Several plants in the garden survived one winter under a thick mulch of straw, but died of basal rot the following season so no further test of hardiness was made.

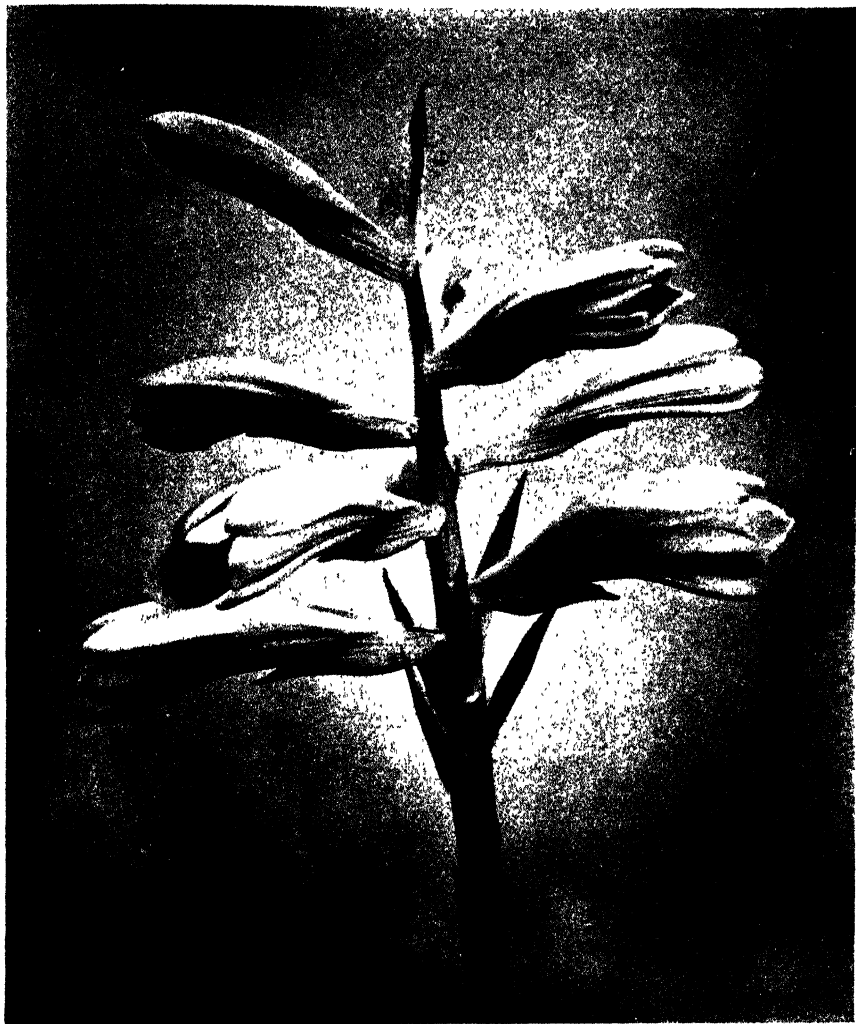
The special feature of this lily is the unusually long tubular flower which grows from seven to ten inches in length and is pure white with a delicate perfume. The plants grow from one to three feet in height and are clothed with grasslike foliage. The bulbs do not all flower at once but continue to send up flowering stems at intervals during the summer. This lily resembles Price's variety of *L. formosanum* and should not be confused with *L. for-*

mosanum which was formerly called *L. philippinense formosanum*. *L. formosanum* was separated from *L. philippinense* in 1930 and accorded specific rank. Gardeners who want a dwarf lily of this type will probably be better pleased with *L. formosanum* "Price's variety."

Price's variety of *L. formosanum* is an attractive pure white lily with a long slender trumpet. The plants do not grow over eighteen inches and bear from one to five flowers. It flowers soon after *L. regale*, is hardy at Geneva, and is easily raised from seeds, the seedlings blooming the second or third year. This form was discovered on Mt. Morrison in Formosa in 1912. It is an attractive lily will worth a place in the border. Its low stature is an asset in a genus containing so many tall species. It is not particular as to soils and thrives in the full sun.

The Easter lily, *L. longiflorum*, as a pot plant is probably the best known of all lilies, but as a garden subject it is grown so little that it deserves mention here. Its merits as a garden plant have been overlooked chiefly because of a supposed lack of winter hardiness. It is likely that mosaic, rather than a lack of hardiness, has given the species an undeserved bad reputation in the garden. Two generations of seedlings have been raised and none have succumbed to the cold. Seedlings vary considerably in floriferousness and it is worth while to raise enough to permit selection of the better plants. These may be increased by detaching the bulb-lets from the base of the stem in the late fall and planting them out. A winter mulch of straw is advisable.

L. Brownii var. *colchesteri* is a variable and handsome Chinese lily that appears worthy of considerable attention from lily cultivators. At its best it is handsome trumpet lily that promises to fill the gap between *L. myrio-*



H. B. Tuttle

Lilium cathayanum

phyllum and *L. formosanum*. In a lot of seedlings raised from seed collected in China were plants that came into bloom from the end of July until late August, the later plants remaining in bloom until near the end of September. Vegetative propagation of the better plants would provide a series of August blooming lilies. The flowers are white within and of two general types, those

with the external color of the perianth segments mahogany red, and those with the flowers creamy yellow in color as they open, but soon fading to white. The more attractive plants bore from three to five flowers that flared open nicely, but with some the flowers are rather narrow trumpets and less attractive.

Unfortunately this handsome species

appears rather susceptible to the three most serious lily diseases. The plants take mosaic readily, are susceptible to basal rot and under favorable conditions considerable damage is done to the foliage and flowers by botrytis blight. Spraying with Bordeaux mixture is advisable to control botrytis. In the shade of a cheesecloth house the plants grew six feet high and tipped over easily, necessitating staking. plants were very chlorotic on a clay loam soil containing lime.

Propagation is by seeds or scales, few if any bulblets being produced. The seedlings do not appear until the second season and grow rather slowly.

Observation thus far seems to indicate that a lime-free soil and a sunny airy site will suit it. Most of the plants are doing well on a sandy loam. There is no indication that the species is not winter hardy at Geneva.

L. myriophyllum (*sulphureum*) is one of the tallest and handsomest lilies the writer has grown. The immense sulphur yellow turmpets atop seven or eight foot stems are a striking picture. So large are the flowers that staking is necessary or the plants will break down in the wind.

Its reputation for hardiness is doubtful, but bulbs have spent several winters in the open ground under a mulch with no losses and it may be hardier than has previously been thought. It grows well in a clay loam soil in a cheesecloth house. Bulbs of a lily as vigorous as *L. myriophyllum* may be planted rather deep, eight or ten inches. This is one of the last species to come up in the spring, the plants not appearing until well into June, but growing very rapidly thereafter.

Large, greenish bulbils are borne near the top of the stem and may be used for increase. Seeds do not set easily but if obtained germinate as readily as those of *L. regale*.

Still another handsome trumpet lily is *L. Sargentiae*. In the past mosaic was rather prevalent in stocks of this lily and its reputation was none too good. A few years ago seeds were received from two sources in China. The resulting seedlings have performed very well growing to seven feet in height and flowering freely. Younger plants with not over five flowers are more attractive than the older plants with many flowers which are somewhat smaller and more crowded than is desirable. The plants grow with great vigor even after several years. One plant dug this fall after four years in the garden had fifteen flowering stems all about five feet in height.

The flowers are pure white within, varying from rose purple to greenish without. Small greenish bulbils are borne and may be used for increase, in fact the ground beneath the old plants is often green with the foliage of the young bulbils the following year. Flowering is about two weeks later than *L. regale* and for this reason the species is most useful. Moreover it is a beautiful lily and is possibly better adapted to a wider range of soils. This species has performed considerably better than *L. regale* on a light soil.

L. Sargentiae is very susceptible to mosaic and moderately susceptible to botrytis. No trouble with basal rot has been observed. Late spring frosts often injure the foliage which should be protected when frosts threaten.

It is as easily raised from seeds as *L. regale* and blooms in about the same time. One plant in a seed flat once bore three flowers the second year from seeds. Thorough mulching of seed flats and plantings of young bulbils is advisable for winter protection. In fact winter mulching of all the trumpet lilies should be routine.

L. rubellum is a very dainty and handsome dwarf lily flowering in early



H. B. Tuttle

Lilium tsingtauense

June. The rose pink flowers, one to four in number are borne on plants growing from one to two feet in height. It is native in the mountains of north-

ern Hondo in Japan where it grows in light shade in a moist clay soil overlaid with a mat of leaf mold. It is not an easy species and numerous attempts to

bring seedlings to blooming size have all ended in failure. The bulblets die in the seed flats, presumably from basal rot. Collected with bulbs however have settled down in the cloth house in a clay loam soil for a stay of several years. Protected from mosaic and with luck as to basal rot one should not have too much difficulty in keeping it. It is a very pretty little lily well worth any efforts needed to grow it.

L. concolor is a dainty low growing small flowered species that provided a welcome relief in a genus with so many husky large flowered six-footers that dominate their corner of the garden. The brilliant red of *L. concolor* soon catches the eye, but it is by no means overwhelming. The plants grow from one to two feet in height and the slender stems bear solitary erect flowers. Some plants make dense clumps of many stems necessitating occasional division to prevent crowding. It seeds freely and is quickly raised from seeds. Rabbits are very fond of the foliage and in one planting they have been so persistent that the plants were soon killed out from overgrazing by these "undelightful" creatures. *L. concolor* is happy in any good soil, prefers the sun and is not troubled much by disease.

L. concolor var. *pulchellum* is taller and bears several flowers. It flowers in mid-June.

A yellow flowered variety is *coridion*. The only plants tried had mosaic and did not perform well. By pollinating this variety with var. *pulchellum* seedlings were raised but all were red-flowered. The second generation contained several yellow-flowered plants all less than a foot in height. These are small enough in stature and flower to have possibilities as rock garden plants.

L. tsingtauense is apparently a rare lily in cultivation and the few with

knowledge of this species consider it difficult. Raised from seed at Geneva it has performed well on a clay loam soil under cloth and on a sandy knoll in the full sun. In the sun, however, the flowers tend to bleach in hot weather. The flowers which appear in mid-June are sometimes asymmetrical and are brilliant orange with a few fine spots. On well-established plants the flowers vary from one to eleven in number. The plants grow from eighteen inches to two feet in height and bear the foliage mostly in one large whorl with a few scattered leaves. In the spring the leaves have a characteristic mottling which is suggestive of one of the trilliums. In a limestone soil some chlorosis is evident. The seed capsules are strongly winged.

The seedlings come up the second spring and grow rather slowly. Bulblets have been seen on only one stem and are evidently very rare. So far the bulbs have not divided. Scale propagation has not been tried, but seedlings are not difficult although rather slow.

L. tsingtauense is an attractive and worthwhile lily well worthy of a place in the garden, but bulbs are scarce and may be difficult to obtain. It is indigenous in the province of Shantung in China and southward from the Diamond Mountains in Korea where it grows in moist shady situations.

L. Duchartrei is an unusually dainty and attractive lily that cannot fail to appeal to all who see it. The small pendulous Martagon type flowers are not bold and striking, but are exceptionally beautiful and if several plants are grown in a colony the effect is very attractive. The flowers are marble white with fine wine purple spots and striations and are fragrant. The stems grow to three feet in height bearing from one to twelve flowers in early July. Numerous bullets are formed



H. B. Tuttle

Lilium medcoloides

along the wandering stem which may travel a foot or more from the bulb before pushing up through the soil. The careless use of a hoe before the plants are up can cause considerable damage to these stems. Hand weeding is advisable while the plants are starting in the spring.

Seedlings come up the second season and grow rather slowly, but are well worth waiting for. The numerous bulblets along the wandering underground stem may be used for increase.

L. Duchartrei is a native of western China in the high mountains of northwestern Yunnan, Szechwan and southwestern Kansu where it grows along the margins of forests in glacial grit with black humus.

L. Leichtlinii is a very scarce and beautiful lily and apparently is infected with mosaic which makes it of little value to anyone except the breeder. If vigorous, virus-free plants could be had this species would easily be one of the handsomest of the yellow lilies. The flowers are of the Martagon type, up to five in number citron yellow in color and bloom with *L. tigrinum*.

L. Leichtlinii var. *Maximowiczii* is the orange red form of this species and is as easy to grow as *L. tigrinum* which it resembles except that there are no bulbils. Easily raised from seeds it varies greatly in time of bloom with some plants flowering in late September. It is of easy culture, but is no improvement on *L. tigrinum* unless late blooming seedlings for autumn flowering are selected.

L. Henryi is a sturdy, vigorous plant too well-known to gardeners to be included here, but some worthwhile variants have appeared. *L. Henryi* itself usually has a weak stem that requires support and the flowers are of a shade of orange that is almost too common in the genus. An attractive yellow flowered form, *L. Henryi* var.

citrinum, possesses the vigor of the parent species as well as the lax stem. It increases well from stem bulblets which are more numerous from heeled in stems. Still another color variant is *L. Henryi* var. *Buttercup* received from Japan as a yellow *Henryi*. It is less yellow than *citrinum* and some seasons the color suggests that of a faded *Henryi*. Under the name of *L. Henryi* Improved an upright form is being offered with a stem rigid enough to stand up without support. This is a good form of a good lily and is decidedly superior to the general run of *L. Henryi* seedlings. The hybridizer who combines the stiff stem of this variety with the yellow flower of *citrinum* will have made a worthwhile contribution to lily improvement.

L. amabile, another well-known orange red lily has given rise to a very handsome yellow form known as *L. amabile luteum*. It is as easily raised from seeds as the type and all the seedlings are yellow flowered if the seed and pollen are both yellow. It is much prettier than *L. amabile* and deserves a place in any garden. It offers no cultural difficulties and is not particular as to soil.

L. cernuum is a dainty small flowered species with grass like foliage and habit that suggests *L. pumilum*. The flowers are rosy lilac, an unusual color in lilies, and pendulous. If it were more vigorous and persistent in gardens it would be a worthwhile addition to a lily collection.

L. Red Star is a low growing lily that seems to have appeared in cultivation without anything very definite being known as to its origin. The foliage is that of *L. pumilum*, the flowers are brick red, face to the side and are asymmetrical with reflexed segments. Some think it is attractive.

L. callosum is of interest chiefly be-

cause it flowers in late July when lilies are scarce. The flowers are brick red in color, pendulous with tightly reflexed segments and are possibly the smallest of any lily. The plants grow up to five feet in height, are slender with short narrow leaves and bear from five to twenty flowers. A colony is not unattractive and the collector of lilies will find it an interesting plant to talk about as the lily season wanes. The general gardener, however, can probably find plants that will make better use of the space than *L. callosum*.

It is easily raised from seeds and is troubled by little except rabbits which seem to be especially fond of it.

L. medcoloides is a modest little lily that grows in Japan, Chekiang, China, and Quelpaert Island off the coast of

Korea. It is said to be highly esteemed by the Japanese, but although long cultivated in Japan, it is little grown in this country. Plants from imported bulbs grow to four feet under cloth in a heavy soil. Some have disappeared from causes not known, but seedlings appear to be doing well although they are slow in reaching the flowering stage. The foliage is concentrated in one or two whorls with a few scattered leaves above. Up to ten flowers similar to *L. amabile* in color are borne rather closely clustered near the top of a rather long stretch of nearly bare stems. *L. medcoloides* is interesting and attractive, but is not likely to become an important garden plant. The specialist will enjoy a few plants in a collection.

NARCISSUS NOTES

B. Y. MORRISON, *Editor*

Texas

27th of February, every twig and branch covered with ice, and the following daffodils in full bloom! Alroi, Cocarde, Brunswick, Royalist, Orange Cup, Carlton, Trevisky, Havelock, Pilgrimage, Yellow Poppy, Beersheba, Naxos, Niphetos, Fortune, Helios, Aleppo, Tregantle, Bodilly and Sulphur Prince.

Always there is February bloom—often much, but rarely has there been such a medley of ones, twos, threes and fours, at the same time.

A very dry warm autumn followed by rains in December and short periods of winter cold, with more or less continuous rains, may have induced a quick growth of scape and premature bud development, resulting in an unprecedented mass of simultaneous bloom, shorter of stem, smaller of flower, yet arrestingly beautiful, even those

dirty of face, until washed clean by gentle rain which followed the ice.

Some choice varieties show no promising buds. Particularly disappointing in this respect is one planting of St. Egwin, which though down three years has never bloomed. One wonders why?

For spectacular garden display, Carlton never disappoints. Marmora in its creamy white loveliness is another that does not fail, and Adler growing near, coming a day or so later, is an example of perfect satisfaction, amongst the many.

Porthilly, three or four years out from Ireland, has shown its claimed brilliance only this season; perhaps a favorable response to cold and rains, in what may be for it, an otherwise unfriendly climate. Havelock, after many years, has also proven its rightful claims to beauty by improving in looks, from year to year.

The reader must remember that Texas gardens have not generally featured daffodils and comparatively, the performance of these mentioned, might be as nothing, to other gardens in a different climate.

I could go on naming the old, those not so old—some of the very new to this garden, with the performance of each, but, of the newest of which I read, and promise myself for a later trial, I have few. The latest additions to my collection, and those holding immediate interest, are Market Merry, Polindra, Carbineer, Diolite, China Clay, Lady Kesteven, Rustom Pasha, Jean Hood and Shirley Wyness. The last two are not promising for 1945 blooms. Of them all so far, Diolite stands at the top.

A Texas garden may not be the best spot for testing daffodils, because of the hot summers, but even so they are a grand beginning for the year's fun, although a by-the-day-man is almost non-existent.

MRS. WILLIAM H. BENNERS,
Dalias, Texas.

Maryland

It's a race between the species *Cyclamineus* and the hybrid *Chicopee* (*Obvallaris* × *Cyclamineus*) as to which will open first and usher in the daffodil season that usually lasts for 9 or 10 weeks until *Recurvus* and *Albus Plenus Odoratus* fade. In some years *Chicopee* comes out a day or two ahead; in others the reverse is true. *Cyclamineus* is a dainty little narcissus, hardy and reliable. I planted 10 bulbs 10 years ago at the foot of a north-sloping terrace where they compete with weeds and grass. There were 16 flowers this year. The pollen is potent and they seed very freely if hand pollinated. Both bloom from 10 days to 3 weeks earlier than *February Gold*, *Alasnam*,

Whiteley Gem, *Fortune*, or *King Alfred*.

1945 will long be remembered as the most unsatisfactory blooming season "in the recollection of the oldest inhabitant." Midsummer temperatures that went above or hung around 80° F. for two weeks in March forced the daffodils so rapidly that they had not time to attain normal size, height, or color. The entire flowering schedule was upset and early, midseason, and late varieties were open at the same time. Few of the red cups were red; some were orange, others yellow. My seedlings were infinitely superior to most of the older varieties and many were really outstanding. The newly introduced *Catskill*, a bicolor *Incomparabilis* from *Bokhara* × *Sunstar*, was especially noticeable because of its large size, height, brilliant color, and abundance of bloom. The large flat-crowned *Ontario* from *Robin Hood* × *Fortune* has the rich copper color of the crown much like that of *Copper Bowl* or a glorified *Fortune*. It has the largest flattest crown that I have seen and it is not out of proportion to the white petals.

Only a few of the older varieties were normal in every way and produced an abundance of fine flowers that lasted well either cut or in the field. They included *Alasnam*, *Beersheba*, *Daisy Schaffer*, *Forfar*, *Hades*, *Jean Hood*, *King Alfred*, and *Seraglio*. The late blooming varieties were better in every way than those that opened early because they had the benefit of cooler weather to grow and open, but they were 2 or 3 weeks earlier than usual. The first *Cyclamineus* opened March 15, *Chicopee* March 17, *Minor* on the 20th, and *Recurvus* which usually closes up by May 10-15 was open on April 16. A few seedling *Poets* carried the season into the first week in May.

The longer I grow it and the more I

left Fortune with only a small degree of the color that makes it so unusual in normal years.

When the time comes that one can

pick a great bunch of it, as he can now do with many of the more familiar sorts, there will be a pleasure as yet unexperienced by most of us.

A Book or Two

The Fuchsia Book. Alfred Stettler, Editor. Published by the American Fuchsia Society, California Academy of Sciences, Golden Gate Park, San Francisco, Calif. 1944. 68 pages, illustrated. \$1.00.

This is the first special publication of the American Fuchsia Society and takes the form of a yearbook with many articles, illustrations both in black and white and in color, and a check list of varieties introduced since 1934. This last is a supplement to the Check List published in 1934 under Dr. Essig's guidance. Our readers will recall Dr. Essig's excellent illustrated paper that appeared in the National Horticultural Magazine in January of that same year.

While the material presented is essentially from California, the book merits the attention of all gardeners, even those who cannot grow fuchsias for one reason or another, in order to appreciate the increasing diversity of form

and beauty that may be found in this old-fashioned but lovely plant.

Garden Graphs. Paul R. Young, Garden Reviews, Inc., New York, N. Y. Distributed by Educational Publishing Corp., Darien, Connecticut. Price—Elementary, 30c; Advanced, 36c; Teacher's Manuals, 16c and 18c. Sample sets, 4 books, \$1.00.

There are two of these booklets, each with its accompanying Teacher's Manual, Elementary Garden Graphs and Advanced Garden Graphs. They are planned for use in school gardens and particularly under present day Victory Garden conditions. The graphs are numerous, clear and simple, and could be read with profit by any beginning adult gardener, who might want to study the teacher's manual as well as the student's text. Everything is covered from the choice garden site and soil preparation, up to the final exhibit. Vegetables are the vital subject.

The Gardener's Pocketbook

Bignonia capreolata again

In the Magazine for April 1945 (p. 158) Mr. Robert M. Senior asks if this plant flowers north of the Ohio River.

I refer him to Deam's Flora of Indiana (p. 858) where he can see a map showing the distribution of the species in Indiana.

Yes, it flowers there and prolifically from Crawford County westward. It grows to large size in the Lower Wabash Bottoms and I have a flowering specimen from Madison, the county seat of Jefferson County. I have seen it in abundance on the ground, on the high, dry banks of the Ohio River but there it rarely climbs. Only in the very southwestern part of the State does it assume its climbing habit.

A specimen planted about 1925 in our front yard in Bluffton (Wells Co.) flowers freely each year and has for some ten years at least. Although the plant is evergreen in southern Indiana it becomes deciduous here. My vine, on a walnut tree, must be 30 to 40 feet high, perhaps more. I have also a younger vine in a Liquidambar tree that has not yet blossomed.

Mr. Senior does not mention the foetid odor of the plant.

I like the plant and would recommend it, but it must be old before it flowers.

A SUBSCRIBER.

Lycoris squamigera (See page 170)

Perhaps those who have had trouble in blooming *Lycoris squamigera* would have better success if they grew them in deciduous shade. They grow with us and bloom freely under beech trees where not even lily of the valley will grow and strangely will bloom under these conditions at least a week earlier

than out in the open. The increase of bulbs is larger than in the bright sunshine.

CARL H. KRIPPENDORF,
Cincinnati, Ohio.

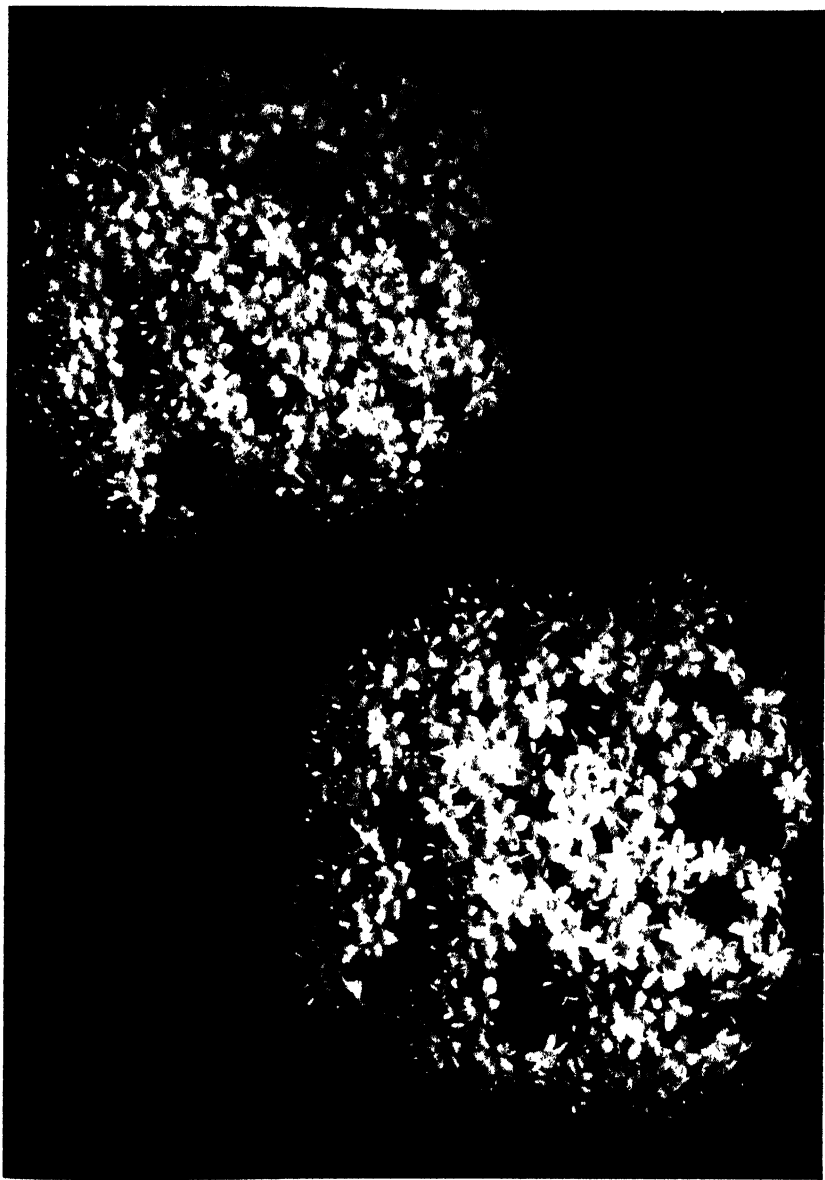
The Black Haw (See page 243)

Among the many valuable members of the viburnum family, the Black Haw (*V. prunifolium*) has qualities which make it a very useful subject in all but the smallest yards. To begin with it thrives in a wide variety of soils and conditions, being rather more resistant to dryness than most viburnums. The plant is little subject to attacks of insects and disease. The foliage, while not as distinctive as in some species, is nevertheless attractive especially as it colors up in the fall. The broad, flat clusters of white or creamy-white flowers make it an object of interest, and the abundant production of oval, blue-black berries which follow, have long had a strong appeal to the small boy. Although the fruit is rather seedy, the pulp has a sweetish taste enjoyed by some. Considerable variation has been noted in the size of the fruits and in the amount and flavor of the pulp.

The very twiggy growth of this viburnum makes it an excellent choice for the tall hedge or screen. It takes kindly to trimming and makes a thick, dense barrier which might be used as a boundary planting or as a background for the herbaceous border.

The new shoots which are slender, flexible, and comparatively straight have been found useful for plant stakes. They may not last as long as the bamboo, but it has this advantage that the amateur gardener can "grow his own."

It is, perhaps, as a specimen small flowering tree that the Black Haw has its greatest possibilities. Trained to a



Robert L. Taylor

[See page 242]

Viburnum prunifolium
Black Haw

single stem it can be expected to attain a height of 25 to 30 feet. A few years ago the writer saw a very fine speci-

men in a farm yard near Annapolis, Maryland. It stood about 25 feet high and had a trunk diameter of about a

foot. The tree was in full bloom at the time and it was literally covered with flowers. Any home owner could well have been proud to possess such an attractive object.

In our rush to acquire every new offering in the nursery catalog, we are prone to overlook some of the valuable plants near at hand. This comes about partly because we do not take the trouble to find out what some of the native types can do when given the same care and attention lavished on the highly advertised new comers.

W. R. BALLARD,
Hyattsville, Maryland.

Green Petunias

Bailey says, "There is no such thing as a pure green flower," and again, "green and yellow-green (which do not appear in the floral world)." My friend Henry Beeman of New Preston, Connecticut, has been a plant breeder for many years. He is now 87 and nearly blind. For several years he has been growing a petunia whose blossoms are of the same hue as the leaves. Deep in the throat is a little color but this is unnoticed unless one looks straight down inside the flower. In a bouquet the flowers are not conspicuous but the single petunia form sufficiently distinguishes them. A colored flower or two is desirable in the bouquet.

In the breeding the green color began as a border. Then by selection and hand pollination the complete flower was gradually developed. The type is not fixed, however. No green flower has been found with pollen. They have appeared each year from seeds that are now four years old. Mr. Beeman is now unable to continue his experiments. Can any one suggest a method of fixing this type?

DR. W. C. DEMING,
West Hartford, Conn.

Dianthus Knappii

By far the easiest of the *Dianthus* in this section is *D. Knappii*. Reportedly quite difficult to grow it was planted in full sun in a lean, sandy border which received very little watering in summer. There it has proved to be of easy culture.

A few of the original plants have died out, but it scatters its seeds with such abandon that seedlings come up as thick as weeds. Some of them may be found thirty feet away in the sand-clay soil of the parking which due to labor shortage has not yet been sodded. There they compete with a heterogeneous assemblage of weeds and have their tops cut off when the weeds are cut.

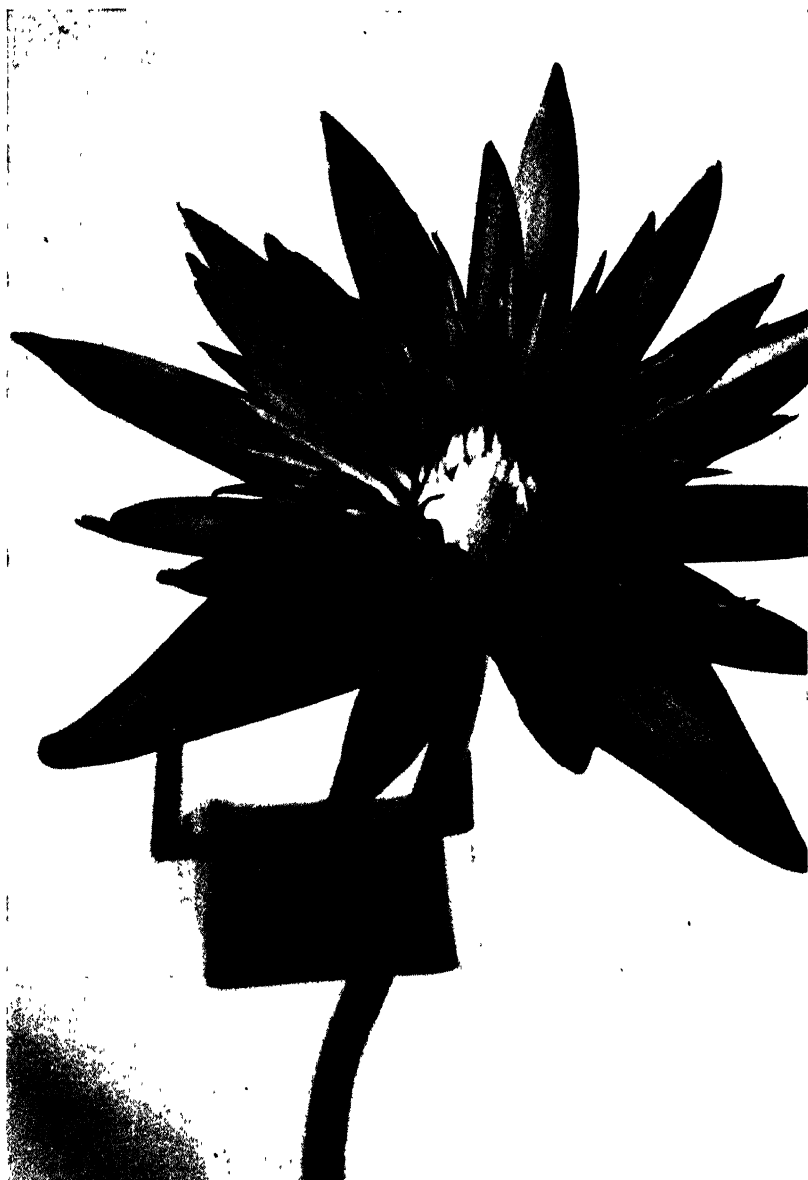
As it is tap-rooted it is quite difficult to transplant. It does not give a great wealth of spring bloom, but gives considerable bloom throughout the summer. The blossoms are not large enough to be startling yet their yellow color always causes comment.

ELEANOR HILL,
Tulsa, Okla.

Two Tropical Water Lilies (See frontispiece and page 245)

Although the variety *Midnight* has already been mentioned in the *Gardener's Pocketbook* (N.H.M.: July 1944) it is only now that we have a picture that can be added to the description given then. By permission we quote from Mr. Pring's own description taken from his excellent paper in the *Missouri Botanical Garden Bulletin* for March 1941, a paper that all lovers of tropical water lilies should own and heed.

"This is double-flowered, an absolutely new break in water-lilies. The flowers are small and dark violet but open widely very early in the day, unlike its parent variety "*Jupiter*." The flowers are fully double, all the stamens being replaced by petals which make a

*Robert L. Taylor*

[See page 244]

Nymphaea, Midnight

dark blue rosette in the center of the flower. . . . "Midnight" is another of the new hybrids with *N. colorata*, and, like all the varieties which have come

from that species, it has numerous leaves and is very floriferous."

To this we should like to add in this issue a picture of the variety Peach



Maxine Williams

Oplopanax horridum

Blow which gave particular pleasure in the pool last summer (1944). The picture like that of Midnight is life size, from a flower grown under ordinary conditions and not treated to special feeding. It is probable that it does not do full justice to the bloom. Nevertheless, it is the color that is the special attraction in this case, a pale clear yellow over which from the tips of the petals downward there is a pale equally clear wash of Pale Amaranth Pink (Ridgway). The flower carries as a clear pink but on closer examination has the lively quality of color that one gets in some rose varieties in which pink is brightened by the yellow beneath the pink.

Although by personal preference, were the writer limited to a single variety he would undoubtedly chose one of the so-called blues, it is only fair to record that this lovely flower has a special charm that should endear it to many once it is known.

Oplopanax (Echinopanax) *horridum*.

Devil's Club (See page 246)

Those of us who were brought up to contrast in the class room the soft sound of sweet Camilla scouring the plain with Ajax' hard efforts in striving some rock's vast weight to throw, will feel that there is a real feeling of sound matching sense in the name of this plant. *Oplopanax* (or Echinopanax as it is called usually) *horridum* certainly suggests a fierce, hateful plant. Horridum, indeed! In the coast forests of Alaska and elsewhere, its great thorns bar the way to travelers. It makes almost impenetrable thickets, growing up to 12 feet in height, with strong, thorny stems. It is, nevertheless, a handsome plant.

The leaves are large, 6-24 inches long, petioled and bright green. They are roundish-heart-shaped, with 3-11 lobes, pinnatifid and irregularly toothed, hairy beneath, the nerves covered with prickles on both sides. The flow-

ers are greenish-white in a dense terminal panicle umbel, calyx teeth indistinct, 5 petals, 5 stamens, alternate with the petals and about twice their length, styles 2. The fruit is berry-like, bright scarlet when ripe. The plant blooms in July and August and fruits in August and September.

It is a handsome shrub, attracting attention wherever it grows and receiving also execration from woodsmen or travelers who try to cut their way through its thorny stems.

Though the plant is commonly known as *Echinopanax*, Hortus 2nd calls it *Oplopanax*, which is, perhaps, an earlier name, though that does seem entirely clear. It was first described, according to the Botanical Magazine, 140.f.8752 (1914), as *Panax horrida*, soon afterwards as *Aralia erinacea*. It was then placed in a distinct section, *Oplopanax*, of the genus *Panax*. It is now considered a monotypic genus. It is a member of the *Aralia* family.

The Devil's Club is a native of the Coasts and islands of North-West America from Sitka and Queen Charlotte Sound to the borders of California and to the western side of the Rocky Mountain Divide. It occurs also in Japan, where it is known as Ari Bouki. Professor Sargent saw it growing in Japan in hemlock spruce forests, flourishing in deep shade.

Planted at Kew in England, it did not succeed very well because the milder climate started it into growth so early that this early foliage was almost always killed by late frosts. It likes a moist soil in partial or dense shade and may be propagated by seeds, suckers and perhaps root-cuttings. It is probably a case, with its thorns, of horrid is as horrid does for in spite of its beauty, it has never been a garden favorite.

SARAH V. COOMBS,
New York.

More about Colchicums and Magnolias

A comment on the note on *Colchicums* by Carl H. Krippendorf in the January number. Another and equally ideal way to plant *colchicums* is to place them near the house under beds of periwinkle (*Vinca*). The coarse *colchicum* leaves as they ripen in early summer can be tucked down out of sight under the dark glossy periwinkle and in September when the bulbs send up their flowers the *vinca* forms a very good background and also holds up the flowers which otherwise would become mud splashed and broken in a heavy rain and would not last in beauty half so long. Every year or so after the *vinca* has grown thickly, give it a severe haircut in early spring, to keep it within bounds and this treatment also serves to make it bloom more profusely so one sees the *vinca* starred with its pale blue flowers, when the *colchicum* are raising their heavy quite majestic looking leaves.

The note from Takoma Park on *magnolias* self seeding interests me for here also they are seeding in a very obliging manner and I also tried potting them up, only to lose them through carelessness and now owing to complete neglect of lawn mowing beneath the big *Magnolia macrophylla*, two very fine and sturdy seedlings have been growing for the last few years for the great tall mother tree is dying. The magnificent cup-like waxy white flower with its long banana-like leaves will be greatly missed this June and it will be years before its descendent flowers. *Magnolia soulangeana* have appeared and died so last Autumn I put small wire fences around one of the larger ones so that it would not be tread upon by my absent minded self.

F. E. McILVAINE,
Downington, Pa.

Mascarena Verschaffeltii—An Unusual Palm

Of the very numerous species of palms grown in southern Florida, few are more unusual or peculiarly beautiful than the plant now known as *Mascarena Verschaffeltii*. It is now rather frequently seen in dooryards and parks in the vicinity of Miami, but it is strictly tropical in its requirements as far as temperature is concerned.

This palm was originally described in "Illustration Horticole" by Herman Wendland in 1866 under the name of *Hyophorbe Verschaffeltii*, by which title it is generally known today. The true genus *Hyophorbe*, however, is now limited to a pair of tall slender palms, unknown in cultivation in this country, from the Mascarene Islands. The palms generally known as *Hyophorbe* in southern Florida have been placed by the palm specialist, Dr. L. H. Bailey, in a new genus, to which he gives the name *Mascarena*.

This genus as now understood consists of three species from the Mascarene Islands, a small group in the Indian Ocean, approximately 400 miles east of the large island of Madagascar. Two of these palms, *M. lagenicaulis* and the present species, are cultivated in south Florida, but the third, *M. Revaughanii*, is apparently not yet grown here.

Mascarena Verschaffeltii is usually seen as a short stout palm with a scanty head of short recurved leaves and a rather prominent bulge below the green crown-shaft. The tree illustrated, however, is an old one many feet in height, thus showing that old mature plants of this species may be used as tall standard specimens. This plant of *Mascarena* is growing in the Fairchild Tropical Garden, near Coconut Grove, Florida, where many other rare and unusual palms and other trees may be found.

At the base of the crownshaft of the palm in the photograph may be seen



three unopened flower spathes and two old inflorescences. The flower-clusters when fresh are of a pleasant yellow color, which, against the gray of the trunk and the green of the crownshaft, form a most striking combination. The fruits when ripe are black in color, about $\frac{1}{2}$ inch long, oblong in shape, and rather shiny.

This palm is ideal for dooryard planting in southern Florida, since it is rather slow-growing and never attains a very large size. Its interesting form and neat appearance, combined with attractive yellow inflorescences, make *Mascarena Verschaffeltii* a palm which should be more widely grown in our southernmost state.

ALEX D. HAWKES,
Coconut Grove, Fla.

FROM THE MIDWEST HORTICULTURAL SOCIETY

Fagus sylvatica pendula

Last year a chance observation called my attention to one of the most desirable weeping trees. This observation was of an old specimen of the weeping beech. Apparently this plant had been in the garden for some twenty years or more, but had escaped my attention.

This plant has a straight stem from which the branches come out horizontally and then gracefully droop. The smooth gray bark of the tree caught my eye through the surrounding shrubbery which screened it from the street. The tree is about twenty feet high and somewhat one-sided from the shade of the elms lining the street. In studying this and other specimens of weeping beech I have been impressed by the desirability of these for accents in the large garden. While the willows are the best known of the weeping types of arborescent plants, the beech has a stiffness of the branches that gives a grace like that of the crinoline skirt compared to the wrapper.

Soil conditions and exposure would be the same for this variety as the species and other forms. Good loam with full exposure, or light shade, and a moderate moisture supply. The largest specimen of this species that I have seen was growing in central Ohio on one corner of a lot with a copper beech on the opposite side. The two had reached full maturity with trunks about three feet in diameter. The magnificence of these was breath-taking.

ELDRED E. GREEN.

Prunus cerasifera pissardi

There are three good clones of purple-leaved plums on the market. There are some who claim a particular advantage to each, but as a nurseryman remarked the differences are so small

as to be of no consequence from any practical standpoint. The purpose of these purple-leaved plums is to provide an accent in the shrub border. This spring has served to accentuate the color of all plants as the leafing out has been extended over a much longer period as cold wet weather has prevailed. Gardens with a plant of colored foliage have stood out from the surrounding sea of green. While height and texture accents are difficult on small properties these plums break the monotony in color and in height. They are low trees in stature and so are above the majority of shrubby material. While it is true that odd colors can be overdone in a garden, yet the judicious use of *Prunus pissardi* and its related purple-leaved plums can be increased in many gardens.

Culture is not difficult. A good garden soil, and an open exposure so the sun can fully develop the coloring are all that is necessary. While not particularly long-lived these plums are inexpensive and grow rapidly so that an occasional replacement may be made without undue loss in effectiveness or value.

Deutzia scabra plena

The deutzias are not too well known to most persons although rather generally listed. Probably most of them are passed off as some form of spiraea by most observers. Another point that may work against the plant is its supposed tenderness. While the plant is top tender to repeated low temperatures this injury occurs only in those exceptional winters when injury to many other plants is also widespread. So far as I have observed, injury has been apparent only once in a decade, and then only during the winter of 1940 when many plants suffered from the prolonged spell of sub-zero weather.

The variety *Pride of Rochester* is the most widely distributed of the deutzias. It is a medium, somewhat spreading shrub slightly larger than the *bridal wreath* and not so drooping. The leaves are a medium green with a grayish cast from the hairy covering. The flowers, which appear in late spring, are white or slightly tinted with pink on the outside and produced in small panicles. The flowers are double and the effect of thousands of little blossoms in clusters covering the plant is quite striking and showy. A plant in full bloom rivals the well-known effect of the *bridal wreath*.

The plant is not particular as to soil and may be grown in full sun or shade. In the latter situation it is not so compact or floriferous. Even if damaged during an exceptional winter the plant produces many strong shoots from the base and in two or three years has fully recovered.

This is an interesting addition to any shrub border.

Taxodium distichum

An interesting tree for the mid-west is a deciduous conifer, the bald cypress (*Taxodium distichum*). While properly known as bald cypress to distinguish it from the genus *Cupressus*, the true cypress of warm countries, popular usage is to refer to this as cypress, and the term is used to apply to the reddish, light wood used extensively in greenhouses and similar places where resistance to decay is important.

Plant ecologists have noted for many years that the cypress is a variable tree. In swamps the plant has a broader head and develops the root projections known as "knees." On dry soils the plant has an erect conical

shape with a central trunk and resembles some of the other conifers in habit. The branches are spreading.

The cypress is deciduous, the small flat needles are shed in the fall after changing from yellow to brown. The needles are in two rows along the branchlets, and give a pronounced feathery appearance to the plant. As a young plant the cypress is erect and conical. In maturity it develops into a tall majestic spire. The old trunks have a brownish bark and become buttressed at the base.

In cultivation either a wet or an ordinary garden location may be selected. Plants should preferably be handled with a ball when perfectly dormant. It should be given ample space so that the majestic aspect of the plant will not be lost.

FOR YOUR BENEFIT

At the suggestion of one of our members, we are announcing that we shall return to a plan tried years ago with little success, namely to open to members the columns of the *Gardener's Pocketbook*, in order that they may list their desiderata which they cannot find in catalogues nor over the neighbor's fence.

In order to avail yourself of this service, your lists must be in two months before the month of the issue, i.e. November for January, February for April, May for July and August for October. If you hurry you can make it for this issue. If in the opinion of the Editor, the inquiry can best be answered by an office letter, he reserves the right to do so, since all members do not have access to all the catalogues that come here.

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Linnaeus in his Lapland dress at the time of his travel to Lapland in 1732.

The Great Swedish Botanist-Linnaeus*

EWERT ÅBERG

Agricultural College, Uppsala, Sweden

It seems very appropriate to speak on Linnaeus on the first day of May. May is the spring month in Sweden and the first of May is celebrated as the first spring day by school children, university and college students, and by people in general. In fact, the first of May is a legal holiday in Sweden, and has been for several years. The universities and colleges, especially, celebrate the arrival of spring, starting April 30, when the students, as well as the professors, put on the white summer student caps. Consequently, on May 1 any university town is filled with students wearing snow white caps and, naturally also, of girls in cheerful spring dresses. Everything looks like spring. All this will tell us one thing: May is the month of spring, of flowers, and of hope for the coming pleasant part of the year, the summer.

Then if we look back to Linnaeus, we find that he was born in May in Småland, in southern Sweden, which probably is the loveliest part of the country at this particular time of year. It can almost be said that he was born "with flowers in his hands" and we will soon find more reasons for this statement.

But to get the story complete and to be able to understand some later developments in Linnaeus's life, it will pay to look on the history of the period when he was born and lived. He was born on May 23, 1707 in Råshult, Småland, and was on May 29 christened as "Carl" for the Swedish king, Carl XII. His father was then a minister in the Lutheran church in Stenbrohult and after a few years the family

moved to Stenbrohult. This was therefore the place where Linnaeus spent his first years. I mentioned that Linnaeus got his Christian name after Carl XII and this carries us to the historic times I wanted to discuss. It was in 1709 that the Swedes lost the battle at Poltava to the Russians, which is considered as significant of the loss of the Swedish power in eastern Europe and the start of the Russian power in that area. It was later, in 1718, that Carl XII was killed at Fredrikshald in Norway and Sweden's great influence in European affairs was lost. This all happened while Linnaeus grew up; and when he had reached the age that he was starting his university studies, and also later during his life, the Swedish government and many of the provincial governors had a viewpoint on future developments in Sweden that can be summarized in the words "regain within the Swedish boundaries what was lost through the wars." The Swedes were at that time tired of wars and this resulted in an increased interest in education, science, farming, and industry. In a way, Linnaeus started out under conditions similar to those under which many men all over the world will have to start after the present conflict is over. Maybe he could serve as an example of what men with energy, ability, and love for their profession and country can do.

In short this was the political situation during the period when Linnaeus grew up and worked in Sweden.

What was the more intimate environment in which he grew up? The opinions on this may differ widely. He grew up in a clergyman's home; his mother was the daughter of a minister, and only 18 years old when he was

*Address at the Annual Dinner Meeting of the Botanical Society of Washington, Washington, D. C., May 1, 1945.



Uppsala from the air showing: a, Linnaeus' house; b, his botanical garden; c, the Uppsala Cathedral where Linnaeus is buried. (After photo by Liljeqvist, Almqvist and Cöster, Hälsingborg, Sweden).

born. It has often been pointed out that Linnaeus grew up under very poor conditions. Possibly he did, because Sweden as a whole was poor after the terrific wars in the beginning of the 18th century. It should be remembered, however, that he did not belong to the very poor group of Swedish people, if so he never would have had a chance to get through schools and universities at that time. Thus it is clearly evident that Linnaeus had a fair chance from the beginning, and I am sure he had more than that insofar as the education in his home was concerned. He grew up in an environment where clergymen, high school teachers, and men of the nobility visited. His family traced back to earlier families that had shown intelligence and energy in their professions.

About his early years, quite a little emphasis should be placed on the content of a letter written by Samuel Linnaeus immediately after Carl Linnaeus's

death. Samuel Linnaeus was the only brother of Carl Linnaeus and a minister in the same community where Linnaeus's father had served. It is evident from this letter that Linnaeus's father had been very much interested in flowers, particularly ornamentals. Now it happens to be common in Sweden for every home to have its own garden. At the present time it is quite the pride of the owner of such a garden to have abundant flowers from early spring to late fall. This might not have been common in the 18th century, but apparently it was practiced by the nobility and clergymen.

There are many stories about how early Linnaeus's father started to put flowers in the hands of the baby and how he used to put the baby out on the grass giving him flowers to play with. How much of this is true is of course hard to tell, but undoubtedly it is true that flowers were among Linnaeus's earliest toys; and that they remained



Plan of the botanical garden in Uppsala during Linnaeus' time. (From Linné-
Naclér; *Hortus Upsalienses*, 1745).

his toys for years. The region where he was born, almost on the shores of one of the finest lakes in South Sweden, is characterized by a rich native flora. The area is just on the border line between the plains in southern Sweden and the hilly and mountainous region to the north. The hills are covered with evergreens, the cultivated fields and the pastures are broken by small hummocks, where birch, beech, oaks, linden, and hazel shrubs occur together; and where species of *Convolvulus*, *Viola*, and numerous genera and species of the family *Ranunculaceae* are abundant. Likewise *Arnica montana* and species of *Erica* and *Vaccinium* are common. Lake Mockeln, just beside Linnaeus's home, has plenty of vegetation along its shores. Such rare species as *Lobelia dortmannia*, *Elatine hydropiper*, *Plantago monanthos* are found there. On Linnaeus's playground, *Narthecium ossifragum*, *Aegopodium podagraria*, and *Viola palustris* grew. And in the woods a little farther away, Linnaeus himself found and reported the plant that now is known as

Linnaeus borealis, the genus named in his honor. These few examples illustrate what I mean when I say that Linnaeus grew up in what we might call a natural botanical garden in South Sweden.

Linnaeus's father kept up his interest in ornamentals and while Carl grew up, he apparently impressed on him his viewpoints. He took Carl with him into the garden to help and he gave him certain sections of the garden to take care of. When Linnaeus had to leave his home at 10 years of age to go to school in Vaxjo, his knowledge of plants and his interest in them brought him in close contact with the principal of the school he attended, a Mr. Lammæus. It also brought him in contact with a friend of the principal, a medical doctor, Dr. Rothman. These two men encouraged Linnaeus to further deepen his knowledge in botany. Probably even then, it was clear to Linnaeus that he was not going to educate himself to be a clergyman, which was what his parents wanted him to do. To us who judge Linnaeus

200 years after he lived, it is also clear that some of the qualifications that later made him the great man in botany already now were noticeable. It has been said by someone that Linnaeus's extremely pleasant personality seems to have opened all hearts and money deposits for him. His personality was already apparent when he came to school in Våxjö, otherwise the school principal and the medical doctor would not have spent so much time with him.

During his school years in Våxjö, Linnaeus was facing the problem how to get over to his parents that he was not going to be a clergyman as they so badly wanted him to be. He got the opportunity once at his home in Stenbrohult when he was with his father who had just been in a discussion with some friends and then had stated: "What one has a desire to do always happens and then is a success." When the party had left Linnaeus reminded his father about this statement and added: "Then do not ask me to become a clergyman." His father, very astonished, asked: "What do you want to be?" The answer was: "I want to study botany and medicine." His father told him of the expense for such an education and about the financial difficulties of the family but got the following significant reply: "If I have the same success as I have desire, then there will always be means." Of course the young Linnaeus won and consequently he went to the university to study botany and medicine in 1727. He first went to the University of Lund. There he did not find the good teachers in botany and medicine that he had hoped to find but nevertheless his stay in Lund was far from a loss. By arrangements of friends of his he got to live in the house of a medical doctor, Dr. Kilian Stobaeus, a man that Linnaeus wanted to learn from. And apparently he did. This Dr. Stobaeus had a good collec-

tion of plants and animals and a good library and Linnaeus certainly used them. Also during the time Linnaeus was in Lund he made excursions to the areas around Lund and there are many profitable places to go to. Lund is my own high school town and part of my university courses in botany were taken there. In fact I lived only 6 miles from the town for about 20 years. There are some very good localities for studying the flora of South Sweden at Kungsängen (meaning the King's pasture) and in Dalby hage (meaning the hummock at Dalby). The latter is now a national park. Linnaeus did not lose the opportunity to compare the flora around Lund with that around his home about 100 miles to the north.

But as Linnaeus did not find in Lund the botany courses he wanted to take, he decided, after conferring with his old friend from his high school days, Dr. Rothman, to start in at University of Uppsala in 1728. It showed a real determination to learn when he decided to make this shift. In Uppsala, there was a botanical garden that Olof Rudbeck, Sr., had started in 1654 to 1657. He cared for it until his death in 1702 and then it came under the supervision of his son, Olof Rudbeck, Jr., who was the professor of botany when Linnaeus came to Uppsala. It is interesting to note that also in Uppsala there were very few courses or lectures that Linnaeus could follow when he first came there. But he spent that much more time in studying in the University library and in the botanical garden. Apparently his first years at Uppsala were rather hard on him financially, but his personality, intelligence, and energy again helped him out. Example of his energy is that in 1729 he went to Stockholm to follow lectures in medicine to supplement what he could get in Uppsala. Few students during the 18th century would

have done this, with the poor transportation system that existed then. In our day, the trip to Stockholm is made in 50 minutes but Linnaeus surely did not make it in that time.

The incident that finally got Linnaeus going in Uppsala seems quite remarkable and a round about way to get the attention of the person that ought to have found Linnaeus much earlier. It was because of Linnaeus acquaintance with Dr. Celsius, then Bishop at the Uppsala Cathedral, that Linnaeus's knowledge of plants was brought to attention of Olof Rudbeck, Jr. Linnaeus is said to have met Dr. Celsius in the botanical garden in Uppsala in the spring of 1729, while Dr. Celsius, who himself was very much interested in botany, was studying the plants there. Dr. Celsius was very much impressed by Linnaeus's knowledge of plants. Later on a paper on the propagation of plants, based on ideas which to Linnaeus sounded very antiquated was being discussed in Uppsala. Linnaeus wrote in this connection a paper of his own on the subject and gave it to Dr. Celsius as a New Year's gift. It aroused quite a sensation in Uppsala; it was duplicated and distributed among the students. One copy was brought to the meeting of the Royal Scientific Society in April 1730 and there a desire was expressed to have it published. Linnaeus himself labeled the paper in 1729 as "*Praeludia Sponsaliorum Plantarum*." The title is in Latin but the paper was written in Swedish. What he brought out was actually the start to our present knowledge of pollination and seedset in plants.

This paper helped to give Linnaeus a position at the University and he started to give courses in botany to relieve Professor Rudbeck from some of his duties. He was asked by his listeners to prepare a list of the plants in the botanical garden in Uppsala. He did

this, but used in his first edition Tournefort's system of nomenclature. However, in his second edition he put his own system into use. This was in July 1730. He kept on editing his list and in May 1731, one of his editions "*Adonis Uplandicus*" was praised very highly by the Royal Scientific Society. In fact this was the outline to what became Linnaeus's famous sexual system of plant classification. It is remarkable to find that it was prepared when Linnaeus was only 24 years old and still a student.

His future success depended on a number of incidents, possibly planned by himself. At the age of 24, Linnaeus had, at a time when traveling was difficult, seen the floras of Småland, where he was born, and of Skåne and Uppland, where he had gone to school. He had followed the ideas that prevailed in the botany departments two Swedish universities. Apparently he had realized that what he now needed was to see more. He was correct. University studies are all right but they are ten times more valuable if they are combined with traveling in other parts of the world. That was true during the 18th century, and it is likewise true today.

Possibly I should point out the length of Sweden from north to south and also indicates how far north Sweden is located. Uppsala is about on the 60th parallel, which means that the extreme southern part of Sweden is on the same parallel as the southern parts of Hudson Bay in Canada. Go 1,000 miles north from there and you are in Lapland, the northern most of the provinces of Sweden. Southern Sweden has lands only a few feet above sea level, northern Sweden has mountains of about 7,000 feet. To any botanist, it is clear that Sweden has a greatly varied flora and that the northern sections have many plants new to a botanist



Linnaeus' botanical garden as it looks today. (After photo by Svenska Linné—Sällskapet, Uppsala, Sweden).

from southern or middle Sweden. This was exactly what made Linnaeus ask for money from the Royal Scientific Society in Uppsala at the end of 1731 in order to go to Lapland. Some of the arguments he used in his application are of special interest. Of course he pointed out the need for studying a section of Sweden that was practically unknown, as far as nature was concerned, but he added, for example, that he was young and could run up and down the mountains, that he was unmarried and therefore did not have to worry about children losing their support, should he be lost. Linnaeus put in his application in December 1731, went home the same month to visit his parents and went to the University of Lund for a short time. With the enthusiasm and ambition he had, he was sure to have a decision on his application when he returned to Uppsala in April 1732. But he was greatly disappointed to find that nothing had been done. Scientific societies during the 18th century were evidently very much

like our own when it comes to reaching decisions. Linnaeus had to file a second application and then got the money to go.

He left Uppsala May 12, 1732. About that day, he wrote in his diary approximately as follows: "It is a beautiful spring day, the sky is clear, it is warm, and there is a gentle west wind. The winter rye is about one foot tall and the barley has developed its first leaf. Few flowers are out as yet but they are starting." Linnaeus went on horseback and passed through several provinces on his way north. Several times on his trip north he ran into winter weather. After two weeks he reached Lapland. He came in time to experience the spring floods and had some rather bad adventures but he did not give up. While he was caught by these spring floods, he learned that the Laps had to go to church regularly and if they did not go they were penalized. This Linnaeus thought was too hard on them because many times they had to make dangerous river crossings



The pond in Linnaeus' botanical garden. (After photo by Svenska Linné—Sällskapet, Uppsala, Sweden).

to reach the church. Linnaeus followed the life of the Laps closely and although one of them once sent a bullet after him he apparently loved them. Besides looking at the Laps he also looked at the girls, as he mentions in his diary an 18 year old Sara Rasch, who was the beautiful daughter of the minister in Rorstad. Apparently he left her in Rorstad, however, as he picked up another Sara on another trip elsewhere.

The way Linnaeus traveled through Lapland, gave him good chances to study flowers and animals, geological formations and life in general. He went on horseback, on foot and in boats on the rivers; he passed over lowlands and mountains and it is evident that he was more impressed by the enormous wealth of flowers on the mountain slopes than by anything else.

The trip took Linnaeus the whole summer and when he was ready to return to Uppsala he could follow the same road he had taken when he came up; he could go by boat or he could travel on the eastern side of the Gulf of

Botnia in what now is Finland. The last was the one that a person like Linnaeus would choose as it would give him opportunities to see and learn something new. On October 10, he was back in Uppsala. His trip to Lapland had been an adventurous one, but it had given him, beside the experience, new and good recommendations. The trip was mentioned in scientific journals outside of Sweden and it was mentioned in detail in the records of the Royal Scientific Society. Linnaeus reported on flowers, minerals, and birds; on ten different kinds of bread substitutes; on 16 different kinds of milk; on the cattle death in the Torne valley, etc. Most important is of course his botanical observations. Some of these were published in 1732 but the bulk of them was published in his *Flora Lapponica* in 1737.

For Linnaeus himself the trip was a very good education; as to his financial situation, it brought him into difficulties. But he continued his studies at the University of Uppsala even if he

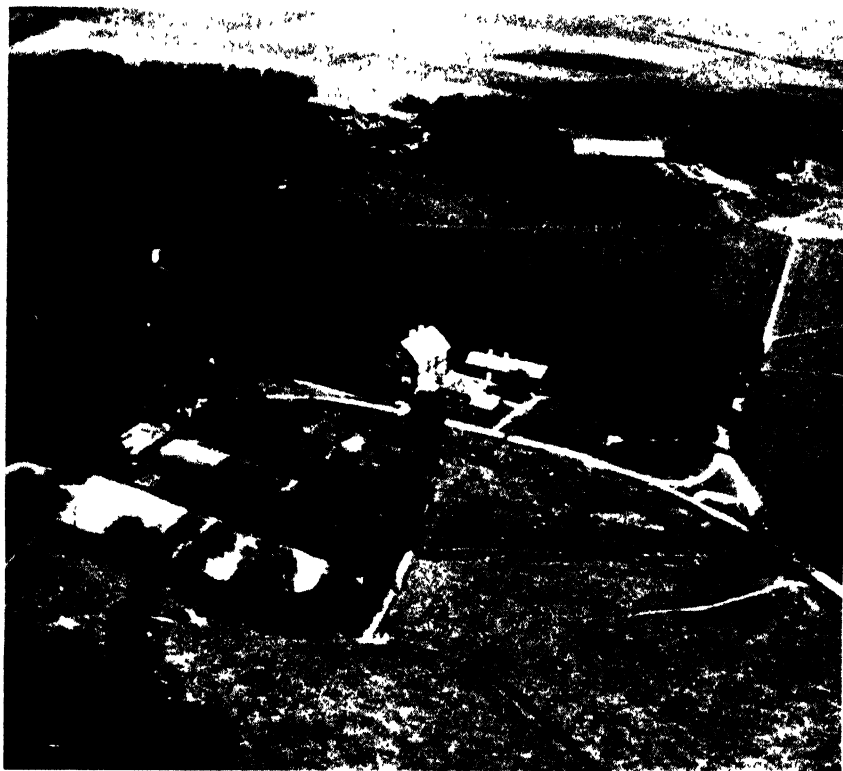
did not get very much of a chance to take part in courses during that time simply because there were practically no courses in botany or medicine to take. There were two professors in botany and medicine, one of them, Professor Rudbeck, was on leave of absence finishing up a manuscript, the other, Professor Roberg, did not have any teaching as he was carrying the responsibilities as the President of the University. So Linnaeus did his own studying, following methods similar to those he had followed in earlier years. At the same time he worked on his *Flora Lapponica*. He did not seem satisfied, however, during the next two years, mainly because of worries over his future.

The offer that ended his worries for some time to come was made by the Governor of Dalecarlia, who had made the acquaintance of Linnaeus during short visits that Linnaeus had made to the capital of Dalecarlia. The Governor was interested in having his province surveyed as Lapland had been surveyed by Linnaeus in 1732. In the spring of 1734 he offered Linnaeus to travel over Dalecarlia and gave him sufficient money for the trip. It was under different conditions that Linnaeus could travel this time as compared to his Lapland trip. The offer shows that the provincial governors were interested in supporting peaceful contributions of value for the development of the country as a whole. On the Dalecarlia trip Linnaeus brought with him eight students from Uppsala, of whom one was an American, even though these students had to travel at their own expense. During the trip Linnaeus observed practically everything that was happening in Dalecarlia and only a few incidents can be mentioned. One example of how poorly plants were known to the people and how mystery surrounded rare plants is

the following. Close to Rättvik there was a tree supposed to have flowers only when changes in the leadership of the nation were coming. It was said to have had two flowers, one white and one black, just before the death of King Carl XII. Linnaeus found it was nothing but a linden. Linnaeus was surprised not to find more flowers on the mountain slopes. He had expected the mountain slopes in Dalecarlia to have more flowers than the ones in Lapland as he was further south but still in the mountains. Linnaeus wrote his report on his trip already in August 1734, gave it to the Governor of Dalecarlia, who was very much impressed by it. And then Linnaeus was ready to start something else.

He did not want to return to Uppsala and decided to go abroad to obtain a doctor's degree in medicine. Before he could go abroad, however, he had to get a degree in theology. Otherwise he would not be issued the necessary passports. Therefore he was forced to Uppsala for his theological examination. He took this immediately when he arrived in Uppsala and also received his degree. It was easy to get degrees in those days.

Linnaeus left Uppsala on December 19, 1734 but did not go abroad directly. He returned to Falun in Dalecarlia to finish up some work on his manuscripts but also took time out, while there, to find another 18 year old Sara, the daughter of Dr. Johan Moraeus. She later became his wife. He stayed in Falun until February 20, 1735 and then went to his home in Stenbrohult, and on April 19 he left Sweden for a stay abroad that was to last for 3½ years. He went through Denmark and Germany. In Lübeck he went to church on April 27 but expressed his dissatisfaction with all the hymns that were sung. Linnaeus was too ambitious and too much a lover



Aerial photo of Linné's Hammarby (After photo by Gosta Gustafsson.)

of nature to sit inside and listen patiently to 14 hymns during one Sunday. He intended to go to Hardivijk in Holland and arrived there on June 6. How university studies were handled at that time is illustrated by the following: On June 7, he had a general examination in medicine and he was found to be so good that he was the same day given a Bachelor of Medicine degree. He had prepared his thesis in Sweden, and after it was examined and printed, Linnaeus defended it on June 24 and that same day obtained his Doctor of Medicine degree.

After this, he intended to return to Sweden but it did not turn out that way. He remained with a person who, among all the friends he made during

his stay in Holland and during his trips to England and France before he returned to Sweden, would mean more than anyone else for his future. He was Dr. Georg Clifford in Hartecamp. Dr. Clifford had at Hartecamp a large garden with numerous foreign plants. Linnaeus was offered the opportunity to stay with Dr. Clifford at Hartecamp and he remained there most of the time that he was in Holland. The way he came there is quite amusing. He had, before he met Dr. Clifford, promised to help a Mr. Johan Burman in Amsterdam with a plant collection of his. Burman did not want to let Linnaeus go but during a visit Burman made to Clifford's house, he became very interested in a book by Hans Sloane on

a voyage to Madera, Barbados and some other islands. Dr. Clifford said I have two copies of that book, you can have one if I can have Linnaeus. The result was that Linnaeus was traded for a copy of a book.

During his time at Hartecamp, Linnaeus had the opportunity of getting to know tropical and oriental plants he had not seen before. Based on these plants, he wrote, during his stay there, the important publication "*Hortus Cliffortianus*," and he had several of his earlier manuscripts published also. Among these were his "*Flora Laponica*" and "*Genera Plantarum*," both published in 1737.

When Linnaeus finally left Holland, he did that by turning down several offers for good positions. Linnaeus had gone abroad to get a medical doctor's degree, he had obtained this in a remarkably short time and had, besides, won fame on his contributions in botany. On his sexual system of plant classification, he had received hardly anything but compliments and favorable support. One of the few criticisms of his system is worth mentioning. It came from J. G. Siegesbeck in St. Petersburg in Russia, who argued that God would not have allowed that several men (the anthers) could have a common wife (the stigma) or, like the case in *Compositae*, that the men should, beside the legal wife, have other wives also. Such a system could not, without causing embarrassment, be presented to the young students. That was Russia 200 years ago.

It seems that Linnaeus should have been given a position in botany at the University of Uppsala when he returned to Sweden. But instead he had to practice medicine in Stockholm from 1738 to 1741. He did not, however, waste his time as he obtained numerous influential friends in Stockholm and he had a hand in starting the Swedish

Academy of Science there in 1739, which Academy by the way, is still active. He did not forget his science for his more practical phase of life, the practice of medicine. There were people who wanted him back at Uppsala. However, the two old professors in botany and medicine did not want to make room for younger men; there was apparently the same difficulty for young scientists in the 18th century as in our day. However, Professor Rudbeck died in 1740 and Professor Roberg finally resigned in 1741. On May 5, 1741, Linnaeus was appointed professor at the University of Uppsala to take the place of Professor Roberg. As it later developed, he instead took over the botanical garden and the responsibilities that had been Professor Rudbeck's.

In 1739 Linnaeus was married to Sara Moraea from Falun in Dalecarlia. She had patiently waited for him all the years he had been in Holland. Before Linnaeus moved to Uppsala, his son, Carl Linnaeus, Jr., later his successor as professor in botany in Uppsala, was born on January 20, 1741.

The first and hardest part of Linnaeus's life ended with his appointment as professor at Uppsala, and his later years were characterized by the experienced man's way of handling and solving problems. It can not be denied that Linnaeus had an unusual experience during the first part of his life when he actually had to fight for his existence, a fight that was, however, eased very much through his sympathetic nature and great intelligence. On the borderline to his new life in Uppsala came three more travels inside Sweden, which he made at government expense, having been asked by the Swedish Parliament to undertake. The first one he made to Öland and Gotland in 1741, the second one to Västergötland in 1746, and the third to



Linnaeus' bedroom on his farm at Hammarby. (After photo by E. Finn).

Skåne in 1749. The trips to Öland and Gotland and to Västergötland were undertaken to find dye plants and medical plants and to study the soil. The trip to Skåne was made to find calcium deposits and certain woods. Also the economic plants should be studied as should plants of purely botanical interest. It is very noticeable that Linnaeus during these trips paid very great attention to economic plants although he did not forget other plants. He was, for example, very much pleased to find such an abundance of orchids in the pastures on Öland; he was very happy when he found *Coronilla Emmerus* on Gotland, as he did not expect this plant to grow wild in Sweden. Altogether, on these trips, he found 130 plants that had not been found in Sweden before.

These three trips were the last that Linnaeus made; and with all the background he now had, it could be expected that his services as professor at

the University of Uppsala should be outstanding. And they proved to be. One of Linnaeus's first arrangements for the botanical garden in Uppsala was to secure the services of Mr. D. Nietzel as a gardener. Mr. Nietzel had had experience in several gardens in Germany and England and came to Uppsala from Dr. Clifford's garden in Hartecamp in Holland. Linnaeus also obtained new greenhouses and more land, and he rearranged the plan of the garden. Then came the question of getting more new plants introduced. He wrote his friends abroad and received very good help from them. He obtained material from Sweden that he did not have before and in a couple of years the number of plants had increased from about 200 species to more than 3,000. And it continued this way. From all over the world, seeds and herbarium specimens were sent to him. Linnaeus himself said once that a tremendous correspondence

had brought to his botanical garden seeds from far off countries like Siberia, Canada, and India. In 1771, a collection of seeds from Siberia was given to him on order by the Russian Empress, Catharina II. And in the same year the King of France sent him seeds that he had collected himself. The continued flow of new material to the garden gave Linnaeus satisfaction and new impulses for future planning. In 1748, Linnaeus published his work "Hortus Upsaliensis," which is one of his very much used publications even now. In this, he described all the plants in the botanical garden. In his efforts in building up the botanical garden, Linnaeus had tremendous help from Mr. Nietzel, until Nietzel's death in 1756. After that, Linnaeus was alone until 1759, when he had his son appointed as his helper in the garden.

The botanical garden that Linnaeus built up has undergone a number of changes since his time. It is now a museum kept very much as it was during Linnaeus's time. The botanical garden of the University of Uppsala is at present at another location where it was started by C. P. Thunberg in 1787. In that year King Gustaf III presented the garden of the Uppsala Castle for use as the botanical garden of the University of Uppsala and it is still used for this. The plants were moved there from the old botanical garden soon after 1787 but it was not until 1807, on the 100th anniversary of Linnaeus's birth, that it was officially opened.

In 1758 Linnaeus bought two farms outside of Uppsala, Hammarby and Säfte. Hammarby became the one we remember, as it is now a museum that will always remind us of Linnaeus. Hammarby is located about 7 miles southeast of Uppsala. In 1762 Linnaeus built a home on Hammarby for himself and his family. Most luxurious in the house were two rooms up-

stairs, one of them with wallpaper that was nothing but drawn plants from the West and East Indies, and the other, his bedroom, that had painted flowers as wallpapers. In 1769 he built what is known as the "Museum," located on a rocky hill beside the farm houses. There he kept his collections, he worked there during his stay at Hammarby and he gave his lectures from there. In the garden around the house, he planted rare plants and he started a Siberian garden there in 1773 with the seeds he got from the Empress Catharina II. Among plants still growing in the garden there at Hammarby are *Mercurialis perennis*, *Tulipa silvestris*, *Corydalis nobilis*, *Campanula latifolia*, *Lilium Martagon*, *Crepis sibirica*, *Gallanthus nivalis*, species of *Aquilegia*, and *Myrrhis*, *Semprevivum globiferum*, *Sorbus fennica*, and many others.

After Linnaeus's death, Hammarby came into the hands of his daughter Sophia, later on was owned by her daughter, and finally by Carl Ridderbjelke, who was Linnaeus's great grandson. The Swedish Government bought the farm from Mr. Ridderbjelke in November 1879 for 30,000 Swedish crowns or about 7,500 dollars. Since then much effort has been put into reconstructing the farm into a museum to look just as it did when Linnaeus lived and worked there. The last time I was at the farm was in May 1940, when the Swedish Linnaean Society had its spring meeting there. It is a lovely place, peaceful, filled with inspiration and relaxation. With its location on the slope of a rocky hill, it is a wonderful place for looking over the fertile lands stretching for miles to the south.

His first lecture as professor in Uppsala, Linnaeus gave on November 2, 1741 and he kept on teaching for 35 years, that is until 1776. His lectures were always popular. His record num-



The "Museum" at Linné's Hammarby. (After photo by T. Kalén.)

ber of students was during the spring semester of 1760 when he had 239 students out of a total of less than 1,000 students in the entire university. It is interesting to see how he taught his courses. They were apparently theoretical observations tied in with practical and economic problems. Sometimes they were very practical. (For example, once he gave the following discussion on *Arundo arenaria* (*Psamma arenaria*): Is used in Holland to prevent the sand from being blown by the wind. This is the grass that has been recommended for use in Skåne. Where it grows, the sand can not move but is blown into a bank like drifting snow. The more sand that moves into the bank, the better the grass grows. Other plants he described in a similar way. There is one description of *Triglochin palustre*: Tastes salty, is pretty good for cattle because where it grows it thrives. It would therefore be advantageous if farmers got seed of it and planted it on suitable places. Dis-

tinguished from other grasses in Sweden by the flower having 6 petals of which every other one is attached lower than the others. It has also 6 anthers without filaments. That his lectures must have been interesting is evident as someone has said that science streamed with pleasantness from his lips, that he spoke with conviction and deep penetration. And that it was impossible to hear him without participating in his enthusiasm.

Linnaeus apparently loved to take his students with him on field trips. There are numerous descriptions of excursions he made around Uppsala with his students.

However, this was only one part of his teaching. Another dealt with his advanced students and collaborators. He had many of them, both Swedish and foreign. The contact with the foreigners who came to Uppsala brought Linnaeus new viewpoints and new plants, herbarium specimens, as well as seed. Such material he also got through his own Swedish students who went abroad. In this way, he kept in contact with the plant world in places where he himself had never been. Among his Swedish students abroad was Peter Kalm, who visited America in 1748 to 1751. Another student, Fredrik Hasselquist, visited Asia Minor, Egypt, and Palestine in 1749 to 1752 but died on his way back to Sweden. However, his valuable collections came to Linnaeus' institution. Still another of Linnaeus' students, C. F. Adler, went to the East Indies in 1748 to 1749 and this was the way it went. Linnaeus was the teacher, he inspired the students, he got them started on their foreign trips, he got continued support for them when they were out traveling and he helped them with their collections after they returned to Sweden.

Some of Linnaeus' publications have

0812 114702
CAROLI LINNÆI

REGIS MEDICI SVECIE ARCHIATRI; MEDIC. & BOTAN.
PROFESS. UPSALÆ; EQUITIS AUR. DE STELLA POLARI,
NEC NON ACAD. IMPER. MONSPEL BEROL. TOLOS.
UPSAL. STOCKH. SOC. & PARIS. CORESP.

SPECIES PLANTARUM.

EXHIBENTES

PLANTAS RITE COGNITAS.

AD

GENERA RELATAS.

CUM

DIFFERENTIIS SPECIFICIS,
NOMINIBUS TRIVIALIBUS,
SYNONYMIS SELECTIS,
LOCIS NATALIBUS,

SECUNDUM

SYSTEMA SEXUALE

DIGESTAS.

TOMUS I.

Non Privilegio S. R. Medici Svecie & S. R. Medici Polonice ac Electoris Saxon.

HOLMÆ.

IMPENSIS LAURENTII SALVII.

1753.

Title page of Linnaeus' "Species Plantarum."

been mentioned already and I will not try to discuss all of them. I believe I should mention at least two others, namely his "Species Plantarum" published in 1753 and the fifth edition of the "Genera Plantarum" published in 1754. These two are the ones that are cited most often in our scientific literature of today. As many of you know, it is the former of these, that is, the "Species Plantarum," 1753, that is designated by the International Rules of Botanical Nomenclature as the starting point for the nomenclature of flowering plants, because it was in this that the binomial system of botanical nomenclature was established.

Linnaeus' private library of 2,500 volumes and his herbarium did not stay in Sweden after his death. They are now among the possessions of the Linnean Society in London. In 1784, they were bought for 19,000 Swedish crowns or about 5,000 dollars by Sir James Edward Smith of Norwich. There are a few herbarium specimens in Uppsala that carry Linnaeus's handwriting. Altogether there are supposed to be 83 specimens, among them several species of *Erica*, specimens of *Rhododendron dauricum*, of *Asclepias pubescens*, and of a few other species.

Linnaeus received many honors for his outstanding contributions. Among them was his being knighted by the King of Sweden in 1762, from which time he carried the name von Linné instead of Linné or Linnaeus. Among other honors may be mentioned that he served as president of the University of Uppsala for several years. The appointment to president of a Swedish University, for which position one of the outstanding professors at the University is selected, is even today a great honor.

Linnaeus was very ill the last few years of his life. He died January 10, 1778. About his family not much will



Linnaeus' tomb in the Uppsala Cathedral and the monument in his honor in the background.

be said. His wife and son, Carl Linnaeus, Jr., have already been mentioned. His son died very young in 1783 and Linnaeus, his wife, and son are all buried in the Uppsala Cathedral. Linnaeus had four daughters. The families descending from Linnaeus all trace back to these daughters. Among such families still living in Sweden are the families Tullberg, Ödman, Martin, Beskow, and Öhrn.

The importance and meaning of all that Linnaeus did for the botany of the world will not be discussed in any detail. But it may be appropriate to summarize in a few words what made him so outstanding for such a long time. His terminology and nomenclature, his system of plant classification are known not only to any botanist but to any educated person in the world today. At the same time we should re-



One section of the present Institute of Taxonomic Botany at University of Uppsala. (After photo by Gramberg's Nya Aktebolag, Stockholm.)

member that Linnaeus knew that his system of plant classification was only a transitional system. We know, however, that it stayed with us for a long time. In fact Linnaeus himself laid the foundation for the natural systems we are still aiming at.

Linnaeus published also on purely biological problems such as happened in his "Politia naturae," 1760, when he discussed the survival of the fittest not in the sense that Darwin did later, but rather in the way that the competition aimed at a balance in nature so that the products of nature could all live and no one could dominate at the expense of the others. That is not exactly what we think and see today, but it shows another field that Linnaeus was interested in.

Linnaeus is supposed to have first found the nectaries in flowers. These he discussed in his "Nectarum Florum," 1762. And there were so many other fields that interested him as can easily be understood from all the activities he took part in during his life time.

The Swedes can rightly be proud to have had a botanist of the capacity of Linnaeus. For the Swedish botanical institutions, he meant much; in the bo-

tanical science of the whole world, he was a pioneer, a brilliant, ambitious and unafraid scientist; yet at the same time a sympathetic human being. He did not conquer the world by force and by the use of big words, but by his sincere, honest love of flowers and the beauty of the world.

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Disease-Resistant and Hardy Varieties of Vegetables

(Continued from October, 1944)*

VICTOR R. BOSWELL

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The vegetable "fruit" crops belonging to the family *Solanaceae* are not numerous but they include the most universally popular and important vegetable grown in American gardens—the tomato. Eggplant and peppers are the only others of importance, but they are, indeed, minor in comparison with the tomato. The tomato not only is grown more extensively than any other vegetable except potatoes and sweet-potatoes but it has been the object of more research and improvement effort. As a result of these widespread and continued efforts to improve it, bewildering numbers of varieties and strains have been developed, some of them representing very marked advances over older kinds. Far less attention has been devoted to breeding peppers and eggplant in America than to breeding tomatoes. In some regions of the Orient, however, the relative importance of eggplant and the tomato is just the reverse of their relationship here.

The term "hardiness" of these three crops refers to their ability to withstand generally adverse conditions and heat rather than hardiness to cold. None of them will survive any degree of freezing, and all are damaged by prolonged exposure to temperature near freezing. Furthermore, most varieties of all three are very susceptible

to a great many diseases which limit their productivity although the plants may not succumb entirely to those troubles.

Tomatoes

As in the instance of sweet corn, discussed in the July, 1944 installment of this series, efforts have been made for a long time to push the culture of tomatoes farther and farther northward. The plant not only is killed by the least amount of freezing but fails to thrive at low temperatures above freezing. The first commercial varieties also required such a long season for bearing a profitable yield that they could not be grown in the short frost-free season of many northern districts of the United States. Much progress has been made in the past twenty years in developing varieties that bear relatively soon after transplanting and that are able to grow vigorously at temperatures that are too cool for most varieties. Generally speaking, these extremely early varieties that are adapted to the districts of short, cool, summers produce small plants with sparse foliage and are definitely less well adapted to the middle and southern parts of the country than are later, larger-growing kinds. Surprising as it may seem in view of experience with some of these varieties in the United States, they have succeeded better than others when planted in certain tropical Pacific islands.

Despite the frost-tenderness of the tomato and its apparent origin near the equator, most varieties grown in the

*This fourth article in the series of the above title originally was scheduled for preparation for the January 1945 issue of this magazine. Unfortunately, the series became a "war casualty", innumerable emergency tasks became too heavy to permit the writer to continue its preparation as planned. A final installment in the January 1946 issue will be the last one.

United States do not bear well during the summer months in the warmer parts of the country. They lack hardiness to heat as well as to cold. This appears to be associated with the fact that although the tomato is native to latitudes near the equator, it came from moderately high altitudes where the weather becomes neither very hot nor very cold. Extremely dry heat such as occurs in summer in the Great Plains and in the Southwest is particularly damaging, almost entirely preventing fruit-setting for considerable periods in most varieties. A full realization of the "heat tenderness" of the tomato is so recent that far less has been to improve its fruitfulness under southern summer conditions than to extend its productivity northward.

The North Dakota Agricultural Experiment Station is pre-eminent in the development of earlier tomatoes adapted to cool, short, seasons. Beginning back in 1925 with the introduction of Red River, that station has introduced about a dozen varieties possessing those qualities, and representing a wide range of types. These include Bison (1929), the most popular and successful of their introductions for many years. Fargo Yellow Pear and Golden Bison were introduced in 1932, Farthest North in 1934, Allred in 1937 and Firesteel in 1938. All these are determinate ("self-topping") in vine habit, and produce fruits of small to medium size. They are not suited to pruning for training on stakes.

In 1941 the North Dakota Station introduced Bounty, and in 1940 the Michigan Agricultural Experiment Station introduced Mingold. Bounty and Victor are quite similar and probably the best of the extremely early red varieties yet developed for our northernmost states. Mingold is yellow, as the name suggests. Fruit and vines of these varieties are larger and

they are more productive than the previous introductions in this category; the fruits also are better protected from the sun by more plentiful foliage. The Harkness variety, developed in Canada, is also very early and adapted to the short, cool, seasons of areas along the United States-Canadian boundary. The Michigan Agricultural Experiment Station has recently introduced a small-growing, medium-small fruited, very early variety, Early Chatham, for cool, moist, short seasons such as prevail in the Upper Peninsula of Michigan.

Bounty has been grown in the Tropics with more success than the larger, later sorts, presumably because it develops very rapidly, sets its crop and matures it so early that there is less time for diseases and other adversities to interfere. Although the plants are neither long-lived nor more resistant to certain diseases than those of other varieties they bear more fruit before they succumb to pests and diseases. It also sets better than the "standard" varieties in our Southern Great Plains.

Another interesting feature of varieties like Bounty and Victor is their ability to set fruit and to bear fairly well under certain conditions of *partial* shade that seriously impair fruitfulness of the larger, later varieties. In the middle part of the country, for example, where varieties like Marglobe and Rutgers do well in full sun but poorly in partial shade—for example, near a house—Bounty and Victor have made fair yields. They do not, however, yield as heavily in the shade as the other varieties do in the sun.

A number of plant breeders are working to develop varieties that will bear well in regions like the Southwest where the season is long and hot—in fact, so hot that the flowers of most varieties are damaged and set little or no fruit for long periods. The Texas Agricultural Experiment Station has

introduced Summerset, a variety with medium-small, round, red fruits, that will set reasonably good crops under Southwestern conditions that cause most other varieties to be barren during the summer heat. Another variety of interest in such districts as the Southern Great Plains is a small, oblong or plum-shaped red one known as the Porter. It was introduced by Porter and Son, Stephenville, Texas. Although the fruits are small the variety has consistently outyielded the well-known, large-fruited varieties in many tests in the Plains area.

Later in this article reference is made to varieties developed by the Illinois Agricultural Experiment Station for specific adaptability to moderately hot weather and rich prairie soils of the Corn Belt. Among these are *Prairiana*, *Illinois Baltimore*, and *Early Baltimore* (introduced in 1936). On light or poor soils these are not superior to such varieties as *Marglobe* and *Rutgers*; but on rich, heavy, soils in northern Illinois, for example, *Prairiana* and *Early Baltimore* far outyield the more popular varieties of the Middle Atlantic States.

Rutgers, now the most extensively grown variety in America, was developed by the New Jersey Agricultural Experiment Station for adaptability to the light soils of the Middle Atlantic coastal plain. It makes an unusually vigorous top and leaf growth on the lighter soils, so that the fruits are better protected from the sun than is true for most other varieties when grown on such soils. *Rutgers*, however, is not adapted to the heavy, rich, prairie soils of the Corn Belt because it grows too rank and does not set heavy crops. Conversely, *Prairiana* and *Early Baltimore* are not adapted to light, sandy, soils because they grow too sparsely. Anomalous as it may seem, these last two may be said to have been bred for

"resistance" to too rich soil—soil that is too high in nitrogen for most commercial varieties to make optimum yields.

Breeding and selection of tomatoes for resistance to disease, particularly fusarium wilt, was begun in 1910 by the Agricultural Experiment Stations in Tennessee and Louisiana; and two years later in Maryland. The oldest wilt-resistant variety commonly available today is *Norton*, introduced in 1917 by the United States Department of Agriculture and named for J. B. S. Norton of the Maryland Agricultural Experiment Station who made the original selection that led to its development. *Louisiana Pink*, introduced in 1918, is also still grown to a limited extent. Both of these have been largely superseded by several varieties having superior earliness or other horticultural characters. Between 1917 and 1933 the United States Department of Agriculture introduced nine more varieties of which *Marglobe* (1925) and *Pritchard* (1932) have been the most important. These are resistant to nail-head spot as well as to fusarium wilt. *Marglobe* was the most extensively grown variety in the country until about 1940 when it was surpassed by *Rutgers* (introduced in 1934). *Rutgers* produces a somewhat larger plant, giving better protection to the fruits and bearing somewhat larger fruits, especially on the lighter soils of the eastern United States, where they are best adapted.

In addition to *Prairiana*, *Early Baltimore*, and *Illinois Baltimore* other wilt-resistant varieties introduced by the Illinois Agricultural Experiment Station (between 1930 and 1936) include several greenhouse forcing strains: *Blair Forcing*, *Lloyd Forcing*, *Urbana Forcing*, *Sureset Forcing*, and others.

Marglobe, *Pritchard*, and *Rutgers*



Fig. 1. Four tomato plants inoculated with the fungus causing fusarium wilt and planted when of the same size and at the same time. Reading left to right the varieties are Bonny Best (dead), Marglobe (nearly dead), Pan America (no disease), Currant (no disease).

are all "red" tomatoes. Those preferring "pink" varieties may be interested in Marhio, introduced in 1930 by the Ohio Agricultural Experiment Station. It is virtually a "pink" Marglobe.

All of the wilt-resistant varieties mentioned above possess only an intermediate or partial resistance to the disease. Although that partial resistance is generally fairly effective in avoiding loss from wilt, it is not always enough. Sometimes especially severe attacks will destroy Marglobe, Rutgers, and similar sorts. Virtual immunity was found in a certain strain of current tomato from Peru in 1936. This was crossed with Marglobe and the resulting progeny back-crossed three times to Marglobe, giving rise to the variety Pan America, introduced in 1940 by the United States Department of Agriculture. This variety, like its wild

parent, is practically immune to all strains of wilt against which it has been tested. Unfortunately, however, it is no more resistant to other diseases than other good commercial varieties. It is similar to Marglobe and is being used extensively as a parent for developing higher resistance to wilt in numerous other types of tomato.

Figures 1 and 2 show differences between wilt-resistant and susceptible tomato plants.

Resistance to numerous other diseases and adverse conditions in tomatoes is being sought vigorously by many research agencies. These tasks appear much more difficult than developing wilt resistance, and many years will be required to obtain results comparable with those involving wilt resistance. However, marked progress has been made in Hawaii in developing spotted wilt resistance and combining it with



Fig. 2. A row of dead plants of Bonny Best tomato in a field of wilt-resistant varieties growing on heavily infested soil. The resistant plants are damaged little or none by the fungus.

fusarium wilt resistance. Pearl Harbor is a new variety developed by the Hawaii Agricultural Experiment Station that is a definite improvement over others for culture in those tropical islands. Greenhouse varieties resistant to leaf mold are Veto-Mold, developed by the University of Toronto and the Ontario Agricultural Experiment Station; Globelle and Bay State, developed by the Agricultural Experiment Stations of Ohio and Massachusetts, respectively.

Several wilt-resistant varieties have been developed in addition to those mentioned above. They will not be discussed here, however, because they either failed to attain much importance or have been superseded by better ones. ✓

Following very promising yields obtained by several public research agencies from first-generation hybrids between selected inbred lines, efforts are now being made by one or more large

seed companies to produce "hybrid" tomato seed on a commercial scale. It is still too early to determine definitely how successful these efforts will be financially and otherwise, but they are being watched with great interest. When commercial seed producers can develop economical methods for obtaining first-generation hybrid seed for general planting, substantial benefits to gardeners should follow as they have in the growing of hybrid field corn and sweet corn. The possibilities of obtaining increased earliness, vigor, and yields have been well demonstrated; it now remains to develop methods of producing the hybrid seed at prices that planters will pay.

Peppers

Garden peppers are somewhat more sensitive to cold than are tomatoes but are distinctly more tolerant to heat, especially the pungent varieties from

Mexico and our own Southwest. In comparison with the work done with tomatoes to improve earliness and adaptability to cool climates, little has been done with peppers. The earliest of the sweet peppers require no longer time to come into bearing after transplanting than do the earliest tomatoes if the weather is warm enough. However, they apparently cannot grow normally at temperatures quite as cool as those at which some varieties of tomatoes can grow well. Thus peppers are not generally grown as far north as tomatoes are.

The Connecticut Agricultural Experiment Station has developed the variety Windsor-A, which bears usable fruits in 57 to 60 days from transplanting; and the Massachusetts Agricultural Experiment Station developed Waltham Beauty, another very early variety for New England conditions. Prior to the introduction of these two, Neapolitan and Harris Early long had been the outstanding early varieties, producing fruit in 60 to 63 days. ✓

Most varieties of peppers, both sweet and pungent, are relatively tolerant of heat, but in the extreme heat and dry atmosphere of summer in the Southwest even this tropical species suffers. Such conditions reduce fruit setting and cause stunting and malformation of the fruits, particularly of the large "bell" types of sweet pepper. The moderately pungent Chili strains, like Anaheim Chili, and the very hot varieties appear to be better adapted to high heat. Mexican Chili, Cayenne, and Tabasco are all quite pungent and heat tolerant.

Although peppers are susceptible to many diseases they generally suffer less damage than do tomatoes. In the Southwest, however, fusarium wilt has caused serious losses to strains of the Mexican Chili. The New Mexico

Agricultural Experiment Station many years ago developed a wilt-resistant variety called Mexican Chili No. 9. With the exception of the work in New Mexico almost nothing has been done until the last few years in breeding for disease resistance. Work is in progress at a few experiment stations at present but no other varieties resistant to wilt or other diseases are now commercially available.

Eggplant

Eggplant is one of the less popular vegetables, probably because it is more difficult to grow than most. It has an even higher heat requirement than peppers, requires a long time to make a crop, is very susceptible to many diseases, and thrives only on soils having high fertility and a uniformly good supply of moisture. It is grown very little in the cooler parts of the country.

The earliest variety commonly available is New Hampshire Hybrid, developed by the New Hampshire Agricultural Experiment Station for adaptability to the short, cool summers of New England. It not only comes into bearing 10 to 15 days sooner than most other varieties but appears able to make satisfactory growth at slightly cooler temperatures. The Central Experimental Farms at Ottawa in Canada introduced a small, early variety, Blackie, adapted to conditions in southern Canada.

For growing in the lower South, Florida High Bush and Fort Myers Market have been developed. Although not highly resistant to diseases these are somewhat less susceptible than the older varieties, Black Beauty and New York Improved. They bear their fruits well up above the soil so that they are less likely to be attacked by rot organisms or otherwise damaged from contact with the soil.

Bamboos for American Horticulture (II)

ROBERT A. YOUNG*

THE HARDY RUNNING BAMBOOS

(Continued from page 196)

In the first paper of this series consideration was given to certain hardy bamboos of several genera other than *Phyllostachys* that have been introduced into the United States. The present paper will be concerned with some of the introduced species and varieties of *Phyllostachys*. The representatives of the genus that we now have in this country range in their mature heights, in a favorable environment, from 20 or 25 feet to about 75 feet.

The species of *Phyllostachys* have a free and open branching habit, with rather small leaves, giving them a strikingly different appearance from any of the members of *Arundinaria*, *Sasa*, and the other genera of hardy bamboos previously mentioned. Like them, however, the plants spread by the extension of horizontal underground stems, or rhizomes (see page 173, July issue), which at intervals send up vertical stems, or culms. Also, as in those genera, the culms develop regularly in the spring, though an occasional one may start during the summer or, in warmer latitudes, even in early autumn. Full growth in height—whether to 10 feet or 75 feet—is attained in 5 to 8 weeks, depending in part on the diameter of the culm but largely upon temperature and moisture conditions. High temperature with adequate soil moisture speeds development. This rapid growth is supported mainly by food materials stored in the underground parts of the plants.

In one or two species of *Phyllostachys* the culms may start early in March in the northern Gulf region, when warm weather with sufficient moisture comes very early; in other species they begin to appear at various later dates during the next month or two. In a cold spring, especially if moisture is deficient, sprouting of new culm shoots for all species is delayed for a month to 6 weeks, and in rare instances may be almost completely suppressed for the entire season. Farther north, sprouting of course takes place a week to a month later in the season, depending upon the latitude and other factors that may affect heat and soil moisture.

The culm in all species of *Phyllostachys* is characterized by its conspicuous "sulcus," a flattened or shallowly-grooved strip on the internodes. Each internode that bears branches from the node at its base is flattened or broadly grooved on that side, and as the branches are borne alternately on opposite sides on the succeeding nodes the internodes are flattened in the same order. All nodes bearing branches are more prominent than are those without. The formation of the sulcus is due to the pressure of the buds, that are later to become branches, on the tender tissues of the developing internode. The branches and branchlets, or twigs, are similarly flattened. The character of the surface of the internodes of the culm is much the same in most species but in a few, especially in the juvenile stage, it is distinctive. The prominence of the nodes also varies noticeably between certain species. The culm sheaths are very characteristic in most, and they always furnish important

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characters for identification. The oblong to lance-oblong leaves, which come out anew each spring, are borne 2 to 6 on a twig, varying in number, size, and shape, both with the species and within it, also with the age of the plant, and on the same culm, branch, and twig. The lower 1 or 2 leaves on the twig drop during the late summer or early autumn, and the remainder fall the next spring after the new leaves appear. The upper surface of the leaf is green, varying somewhat in shade with the species, and the lower surface is glaucous, sometimes conspicuously so.

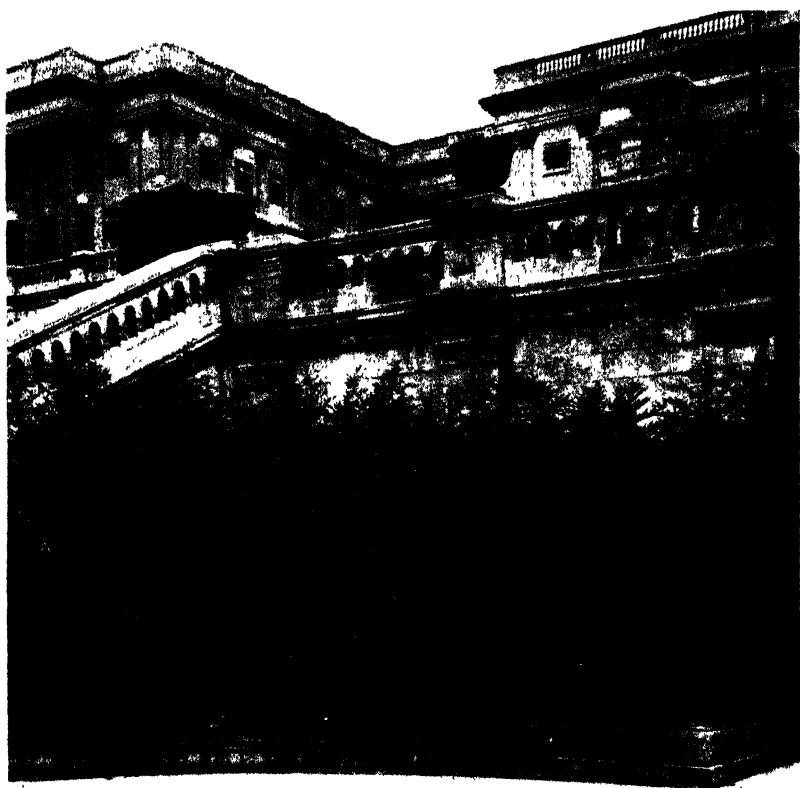
There are commonly only 2, unequal, wide-spreading branches at each branch-bearing node of the culm, though there is often only one branch at the lowest and may be 3 or rarely 4 at some nodes near the top. The larger branches are often twice rebranched. Some nodes near the base of most culms are without branches, and giant culms are commonly unbranched to heights of 20 to 30 feet. In this region of such a culm the sulcus is lacking and the internodes are cylindrical or are sometimes slightly oval in cross section. The culm walls in *Phyllostachys* are usually of only moderate thickness but the wood is tougher in general than that of the other hardy bamboos with a few exceptions. In a number of the species some of the lower internodes occasionally may be nearly or quite solid, and in at least one (*P. purpurata*), the lower nodes are rather regularly solid and the upper have only a small central canal.

The quality of the wood, even when fully mature (3 seasons old before cutting) varies among the different species of *Phyllostachys*. For this reason and because of differences in size, the various species often have had special uses in the Orient, and as more precise information is obtained concern-

ing the physical properties of the woods of species being grown in this country, reasons will be found for choosing particular species for particular industrial purposes. While it is neither likely nor desirable that bamboo shall be used so universally in this country as it is in oriental countries, where it has existed much longer than man himself, there should be a multitude of uses to which it could be adapted with profit and satisfaction when we have learned enough about it, have the inclination to use it, and when there is an adequate domestic supply.

The maximum heights of a number of species of *Phyllostachys* are not known with certainty. Several that have been reported as of low or medium stature have recently developed heights of from half again to 2 or 3 times as great. No bamboo grown in infertile soils, with deficient moisture, will ever attain the size that it will under better conditions. In attempting in the following pages, therefore, to treat of some of the members of the *Phyllostachys* group in something near the order of size, I shall ask the reader to remember that in some instances the maximum heights indicated are tentative.

Phyllostachys aurcosulcata McClure, shown on page 276, is in an early stage of development, as it grew some years ago on the West Front of the U. S. Capitol in Washington. (The plants have since been removed.) It is a medium-sized Chinese bamboo, known to reach heights of at least 30 feet in favorable environments in the South. The plant was originally collected, with many others—all unidentified—in various localities in Chekiang Province, China, in 1907, by the late Frank N. Meyer, agricultural explorer for the U. S. Department of Agriculture. Because related species in this collection were planted too near one another in



Phyllostachys aureosulcata, a Chinese hardy bamboo, in early stage of growth on West Front of U. S. Capitol, Washington, D. C., as it appeared in 1933.

the nursery, however, before the danger of their invading each other's ground was realized or adequate descriptions of the various kinds could be made, crossing over of the rhizomes took place to such extent that the record of origin of some species was confused.

The name and technical description of *P. aureosulcata* have just been published (Journ. Wash. Acad. Sci. 35: 282, Sept. 1945). The specific name alludes to the pale-golden or yellowish color of the sulcus (the flattened or grooved area of the internodes of the culm and branches) that is present during the first year. In the second

year, as the green of the rounded part of the culm or branch becomes paler, the yellowish color of the sulcus becomes gradually less apparent and by the third year is practically indistinguishable from the faded green of the rounded part. During the first season at least, the pale-golden sulcus constitutes an infallible means of identification of this bamboo. Another useful character is a faint roughness of the culm and branches that can be felt when the fingers are moved gently upward over the surface. This roughness also becomes less perceptible with time, but the newer culms will always exhibit unmistakably both of the char-



Phyllostachys flexuosa, 25 feet high, growing at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. The drooping habit of the foliage is clearly evident. (12-foot measuring pole at right.) Photograph by D. A. Bisset.

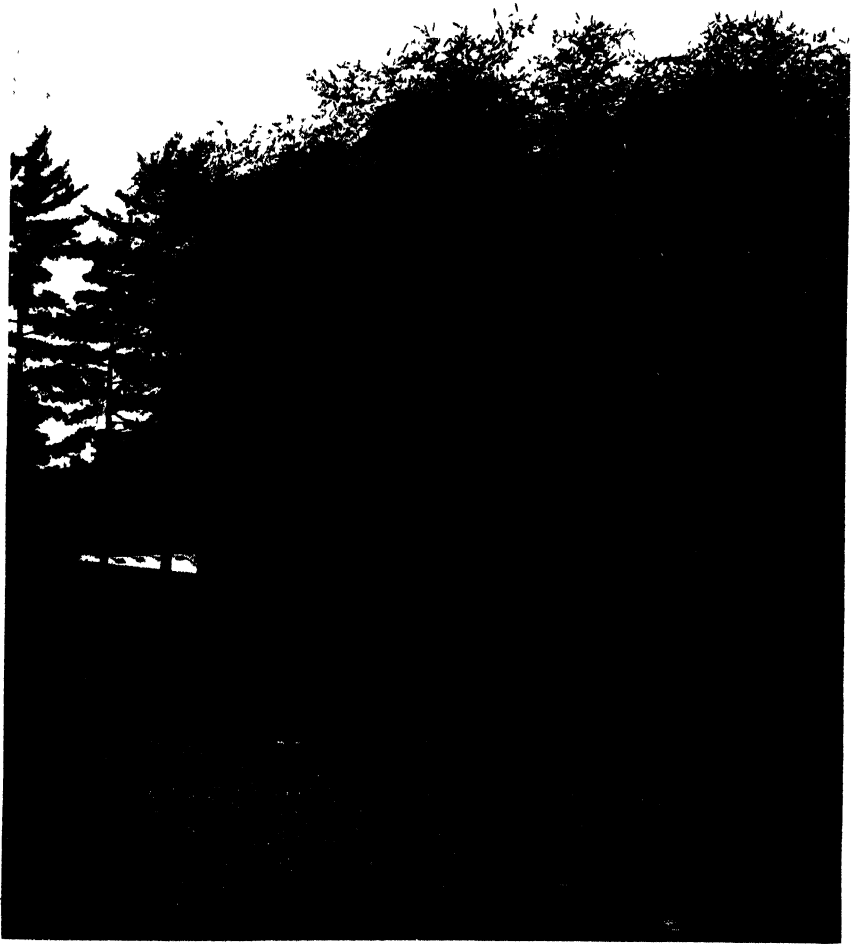
acters described. The light-green culm sheaths, with their slender whitish stripes and prominent, bristled auricles at the apex, are likewise very characteristic during the period of development of the new culms; the auricles are usually absent, however, on the lowest 4 or 5 sheaths. The leaves, 2-5 inches long by $\frac{3}{8}$ - $\frac{5}{8}$ inch wide, are borne 3-5 on a twig. The new shoots, when of sufficiently large diameter to be useful for food, are reported to be of very good quality.

P. aureosulcata was for a time erroneously placed under *P. nevinii* Hance and was sent out widely under that name. Since discovery of the error, up to the present, plants have been sent out by the Department of Agriculture simply as "*Phyllostachys* sp., P. I. No. 55713." The mature culms, when of suitable sizes, are useful for fishing poles, various types of plant stakes, and numerous other purposes.

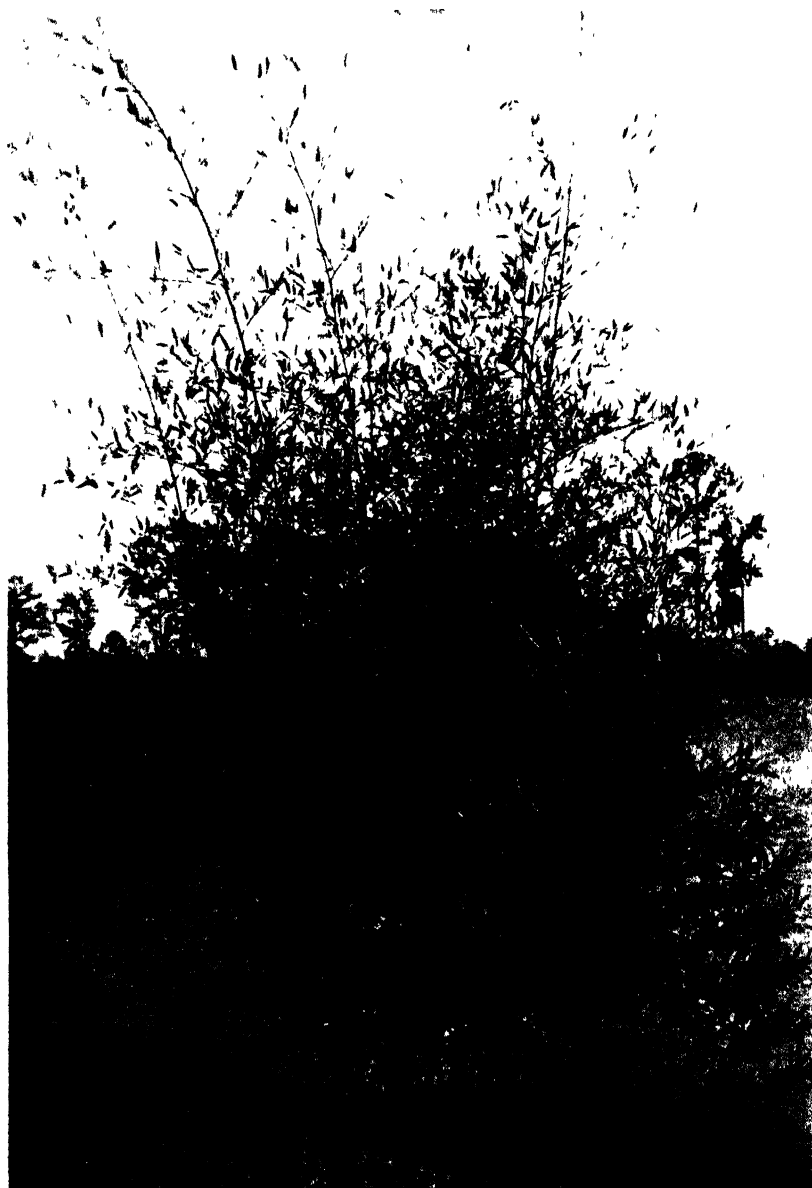
P. flexuosa A. & C. Rivière appears to be a markedly variable species when grown from seed. It is native to China, though first described from Algiers. I have seen it from 3 or 4 different sources, probably from different seedlings, and only one—that shown on page 277—obtained by the U. S. Department of Agriculture from France many years ago, exhibits the flexuous character of the branches that would suggest the specific name *flexuosa*. It has grown to a height of 25 feet at Savannah, Ga. Another introduction of the species has failed to reach that height, while a third recently has greatly exceeded it. Although the qualities of the wood have not been reported upon, it may be presumed that the culms will be found serviceable for most of the purposes for which those of similar sizes of *P. aureosulcata* are used. The young shoots have not been tested for edibility, as they have been thus far too small for practical use.

The leaves are 2-4 inches long and are borne usually in 2's or 3's on the twigs. The culm sheaths are somewhat variable in the different forms but in general are dull green when fresh and dull straw color after drying, and they are more or less dotted with small brown spots.

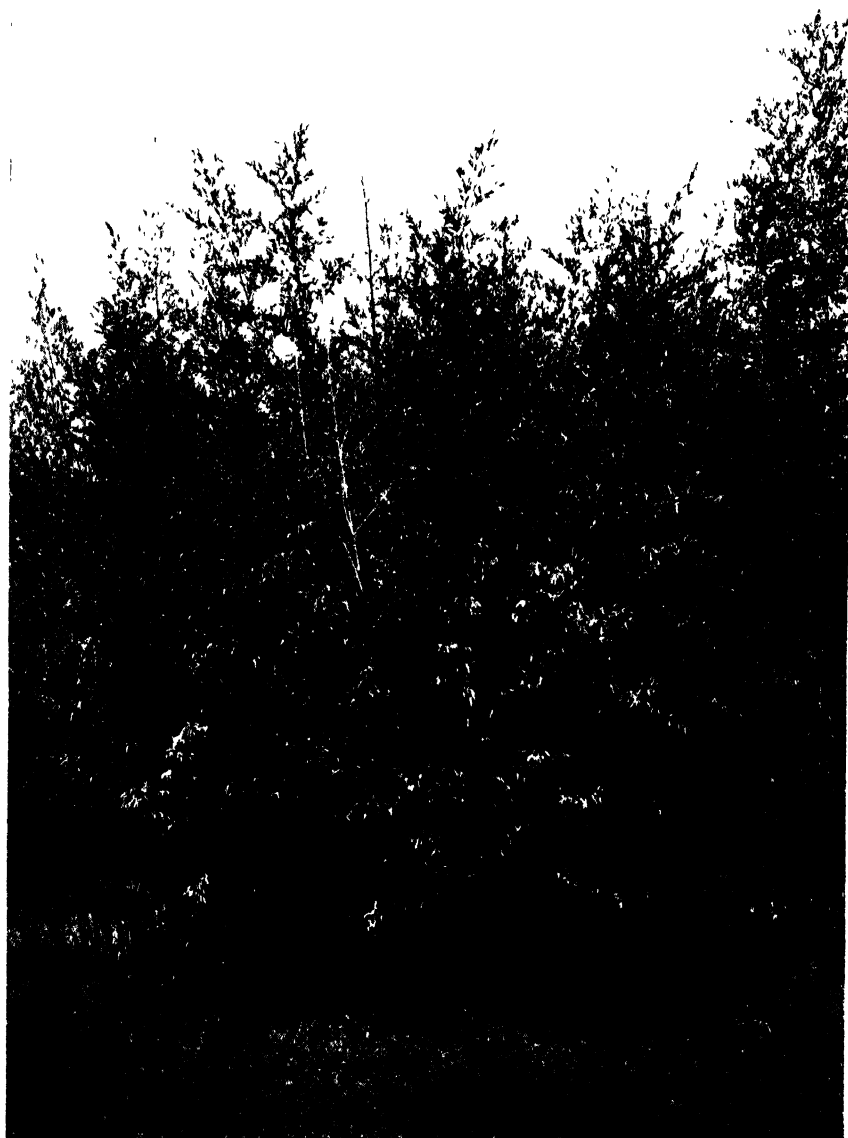
P. viridi-glaucescens A. & C. Rivière, shown on page 181 (background) of the July issue of the Magazine and on page 279, is a native of China and is one of the smaller to medium-sized species of the genus so far introduced into the United States. It was first introduced into France in 1846. From its specific name one might expect it to be strikingly distinctive in its greenness or in the glaucous character of the under surface of the leaves as compared with other species of *Phyllostachys*. The foliage does not, however, differ greatly in either of these respects from that of most others. The leaves, 2 or 3 to 5 on a twig, are $2\frac{1}{2}$ - $6\frac{1}{2}$ inches long and resemble so closely those of the giant timber bamboo, *P. bambusoides*, that they can scarcely be distinguished except by their perfect flatness from those of the latter species, which often are slightly wavy. The bristles, or oral setae, which radiate from the pair of auricles at the apex of the sheath of the new leaves, however, are more prominent than are those of almost any other species of the genus, but like those in other species they tend to disappear after a few months. The dry culm sheaths are dull straw color, lightly spotted and blotched with brown, and have a characteristic roughness on the upper part of the outer surface, due to scattered minute projections from some of the veins, noticeable when the fingers are moved carefully downward on the sheath. I have not found this character in any other species. The maximum height recorded at Savannah for



Phyllostachys viridi-glaucescens, 18 feet high, in a mature planting at Biltmore, N. C.



Phyllostachys nigra, a black-culmed oriental bamboo, in an early stage, at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.



Phyllostachys nigra f. *muchisasa*, one of the taller varieties of the black bamboo, 24 feet high, with a slightly drooping tendency of the foliage. Growing at the Barbour Lathrop Plant Introduction Garden, near Savannah.

P. viridi-glaucescens is about 24 feet—a third taller than that attained at Biltmore, where minimum winter temperatures sometimes are injurious. As to economic uses, the same may be said of it as for the preceding species.

P. nigra (Loddiges) Munro, the black bamboo, exists in several different forms, some of which at one time or another have received varietal or form names; a few have culms with little or no black. They originated in China and Japan. A view of a small planting of one of those from Japan, in an early stage of development, appears on page 280. It is very similar in appearance to a form obtained from England which may possibly be the same one for which the specific name *nigra* was first used. It differs, however, in sending up its new shoots later in the spring. The truly black bamboos that have been introduced range in their ultimate heights from about 20 to 25 feet or perhaps more. The culms and branches are at first green, with only a blackish shading of the nodes, and the ultimate black coloration develops gradually through the first or sometimes the second year. The different forms vary in this respect as well as in certain other characters. Biologically, the black and blackish-culmed bamboos constitute a group of varieties or forms of a medium-giant, green-culmed bamboo, but unfortunately the specific name *nigra* for one of the black forms—introduced early into England from China and grown by the London Horticultural Society—was published many years before the large green-culmed plant became known to science. The latter, when discovered, was first given the name *P. henonis*. The obvious fact of the relationship was recognized later but, under the rules of botanical nomenclature, the specific name first published had to stand, so that the giant green bamboo, presumably represent-

ing the original wild form of the species, became a nomenclatural variety of *P. nigra*, the much smaller black type, which is considered to be a garden variety. This giant bamboo (*P. nigra* var. *henonis* (Mitf.) Nakai) will be treated among the other hardy giants. The leaves of mature plants of the entire *P. nigra* group are rather small, ordinarily from 1½ to 3½ inches in length, a little narrow, and usually in 2's, sometimes 3's, on a twig. The fresh culm sheath is mauve, usually shaded or finely speckled with black on the upper part, with a small, crinkly, green blade at the apex, and a pair of very prominent dark-purplish auricles bearing conspicuous purplish bristles; the sheath dries to a straw color. The culms are rather thin walled but can be used for many purposes for which great strength is not required. Aside from its original name of *Bambusa nigra*, the black bamboo was later for a time called *Phyllostachys puberula* var. *nigra*. A common Japanese name is Kurochiku.

P. nigra forma *punctata* (Bean) Nakai may be called the Blackspot bamboo, to differentiate it from the other black types. It is credited to China in origin, though it probably reached the Western World from Japan. In the Blackspot variety the culm is not solid black but becomes dull-black-spotted during the second year, later turning nearly but not quite solid black and, finally, becoming overcast with gray. It has grown to about 23 feet high at Savannah, Ga. According to I. Tsuboi, the noted Japanese horticulturist and bamboo specialist, the culms of this variety are considered to be much more durable than are those of the ordinary black type grown in Japan. The Japanese names for it are Nitagurochiku, meaning "near-black bamboo," and Gomadake. Botanical synonyms are *Bambusa nigro-punctata*,



Phyllostachys sulphurea, a Chinese bamboo with culms of a clear sulfur-yellow color, at the Barbour Lathrop Plant Introduction Garden near Savannah, Ga. The tallest culms here are scarcely 18 feet but greater heights are attained.

Photograph by D. A. Bisset.

Phyllostachys nigro-punctata, and *P. puberula* var. *nigro-punctata*.

P. nigra var. *muchisasa* (Houzeau de Lehaie) Nakai, a view of which is

shown on page 281, is a black-stemmed variant grown in Japan and in Formosa (Taiwan), but the country of origin is said by the Japanese botanist Dr. T.



Phyllostachys aurea, 30 feet high, oriental bamboo long established in cultivation in the South, growing at the Barbour Lathrop Plant Introduction Garden near Savannah, Ga. The culms, often with irregular internodes near the base, are much in demand for fishing poles and other uses.



Phyllostachys aurea, kept in artificial clump form by cutting all culms that come up on the outside. This clump, growing in 1933 at the U. S. Plant Introduction Garden, Glenn Dale, Md., had a diameter of 6 feet at the base.

Nakai to be in doubt. It was introduced into Europe many years ago, from a source not now known. It is not clear to me why this bamboo is retained in varietal rank when the preceding one (*P. nigra* f. *punctata*) is accorded only the rank of "forma." I have not observed anything in either that would suggest the difference in treatment, and I therefore propose here the reduction of the variety to the rank of forma, as follows: *P. nigra* f. *muchisasa* (Houzeau de Lehaie) R. A. Young (*Phyllostachys puberula* var. *muchisasa* Houzeau de Lehaie in Actes III^e Congr. Int. Bot. Bruxelles II p. 223. 1910). At the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga., culms of this bamboo up to 24 feet high have been produced. The culm is a nearly uniform black, and the foliage is fairly abundant and tends to a slight graceful drooping. The Japanese name is Muchisasa, and this already has been adopted in Standardized Plant Names. Another botanical synonym is *P. nigripes*.

Another black bamboo, introduced from China by the Department of Agriculture in 1926, is very distinctive in having culms that become a brilliant purplish black by the end of the first year. The Chinese name for it is Oochuk. It was collected on Peng Mountain, Lungtau Mountains, by F. A. McClure. The foliage is similar to that of Muchisasa. In the early stages of development it gave promise of being definitely drooping, or willowy, in habit, and the horticultural name Willowy for it was given in Standardized Plant Names. As the stand became older, however, this character largely disappeared, and the name now seems doubtfully appropriate.

P. sulphurea A. & C. Rivière, the sulfur bamboo, is native to China though, like several others, described from Algiers (in 1879) from plants

grown there from an earlier introduction into Europe. It received its name in allusion to the color of the culms and branches. They are clear sulfur yellow except for 1 or 2 slender green stripes on the rounded part of the internodes, and an irregular green ring just below the node. A view of the sulfur bamboo in process of development appears on page 283. Although the height thus far attained at Savannah is only about 18 feet, it is reported to have considerably exceeded this in Europe, and it may be expected in time to produce culms 25 to 30 feet high. The leaves are in 2's and 3's on the twigs and are up to 5 inches long. The lower culm sheaths when fresh are brownish yellow to yellowish green and more or less spotted with shades of brown; they are entirely glabrous and are perfectly smooth on the margins. The culms tend to taper a little more strongly than do those of its relatives, the base being slightly thicker in relation to height. The naming of *P. sulphurea* represents a situation somewhat similar to that of *P. nigra*, though different in detail. The plant is biologically a variety of a much larger, green-culmed bamboo (*P. sulphurea* var. *viridis* R. A. Young) but, having been validly named earlier, it retains its nomenclatural specific rank. The combination "*P. mitis* var. *sulphurea*" was used informally by J. Houzeau de Lehaie. *P. sulphurea* has had no other name except that it has been mistakenly treated by one or more Japanese botanists as a variety of *P. bambusoides*, which it assuredly is not.

P. aurca A. & C. Rivière is thought to be the earliest species of this genus to be successfully introduced into the United States. Notwithstanding the extensive later placing of experimental plants of other species with nurseries and individuals by the Department of Agriculture and the subsequent sale of



Basal sections of selected culms of Phyllostachys aurea, showing the characteristic distortion of nodes and internodes of some of the culms that makes them attractive for walking sticks, etc.; no two culms are exactly alike but some are very similar. The base of nearly one-half of the culms may exhibit these irregularities of structure. Photograph by Robert L. Taylor.

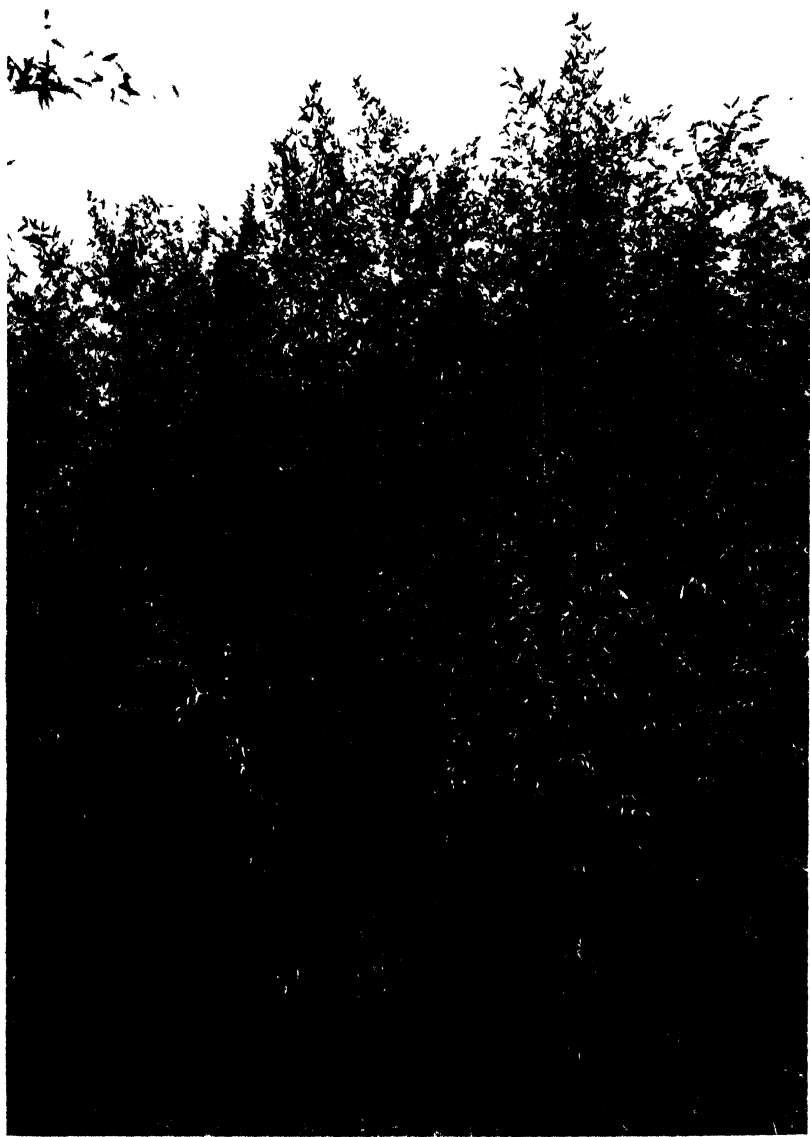
propagations from these by nurserymen, *P. aurea* probably is still, on a small scale, the most widely grown member of the group. A recent view of a plot at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, grown for comparative study purposes from plants obtained from the Royal Botanic Gardens, Kew, England is shown on page 284. The height of 30 feet indicated is probably not the maximum for the species, as there are unverified reports from other sources of 5 to 10 feet greater. The largest single area of *P. aurea* of which I have heard is one of about 10 acres, owned by Mr. George H. Todd of Montgomery, Alabama. This was started a great many years ago by Mr. Todd's father, George H. Todd, Sr., from plants that he obtained direct from Japan. Although the species has the creeping rhizomes of all its relatives, it spreads much less rapidly than many. It is not difficult to confine it to a satisfactory clump form, for a number of years at least, by cutting any culms that may come up beyond the limits desired. A clump so formed is shown on page 285. The leaves of *P. aurea* are mostly rather small but they range up to 5 inches long; there are usually only 2 or 3 on a twig. The species has flowered oftener than any other of the introduced bamboos but little seed has been produced. An outstanding characteristic of this bamboo is a type of distortion of many of the culms by which a varying number of the lower internodes are shortened, in a very irregular manner; the nodes occasionally are inclined at an oblique angle, and there appears to be a form in which this pattern is commonly carried out in such a way as to give a tortoise-shell effect. This crowding of the nodes makes such culms very attractive for distinctive fishing poles and walking sticks, especially in view of the fact that the wood of this spe-

cies is generally rated high in strength. A photograph showing the larger ends of a collection of walking sticks produced by Mr. E. A. McIlhenny, Avery Island, La., appears on page 287. The mature culms of this species may be considered as of high quality generally for all purposes to which bamboo of its size range may be adapted. The specific name *aurea*, which would seem to imply a distinctly golden or yellow coloration, is to that extent a misnomer. The culm is green at first and becomes no more golden with age than do the culms of numerous related species when grown under similar light conditions; and of course it does not at any time compare with the brilliant culm of *P. sulphurea* or that of *P. bambusoides* var. *castilloni*—to be discussed on a later page. The form of *P. aurea* with the tortoise-shell pattern in some of the culms has been called *P. heterocycla* but aside from this I do not know of any other name in scientific form, nor have I known of any appropriate common name for the species.

P. purpurata McClure, of which a view is shown on page 289, is a Chinese bamboo introduced in 1927 by the Department of Agriculture. It among others was collected in Anhwei Province, by F. A. McClure, then agricultural explorer for the Department. The species is of more than usual interest because of the solid or nearly solid lower internodes of the culm and the thick-walled higher ones. It is possible that some variation in this character of the culms among clones of different seedling origins will be found, as differences among them of 10 to 15 feet in apparent maximum height have been observed; variability in soil, however, may be a factor here. The clone with the 24-foot culms shown in the photograph appears to be intermediate in height. The culms of *P. purpurata* are comparatively slender and com-



Phyllostachys purpurata, a Chinese bamboo with solid or nearly solid culms. The height of the culms here is about 24 feet.



Phyllostachys bambusoides var. *castilloni*, an oriental bamboo about 28 feet high, with golden-yellow culms with a bright-green stripe on each internode. Photograph by D. A. Bisset.

monly are bent or arched. The foliage is a somewhat darker green than that of many other species of the genus. Characteristic is an unusually thick, matted growth of rhizomes and roots near the surface of the soil. This suggests possible value of the species as a soil binder on earthen dams and levees.

P. bambusoides var. *castilloni* (Marl.) Houzeau de Lehaie, as the name indicates, is a variety of the hardy giant timber bamboo, *P. bambusoides*. It is a comparatively small variety, probably not much exceeding the 28 feet in height that it has attained in the planting at the U. S. Barbour Lathrop Plant Introduction Garden, shown in the photograph on page 290. The type commonly reaches 60 feet and more under favorable conditions. The variety is instantly recognized by its golden-yellow culms and branches with the bright green sulcus (flattened side) of each internode; occasionally traces of the green on the sulcus extend upward into the rounded part of the next internode above. The leaves, usually 3 to 5 on a twig, range from 2 to 6 inches in length; they are commonly a little wavy and sometimes have 1 or 2 narrow creamy-white stripes. Most of the varietal characters appear to be subject to variation at times. Mr. Julian Nally, the present owner of the place at Gotha, Florida, formerly owned by the late Henry Nehrling, found a sport a few years ago in which the green coloring of the sulcus was

entirely absent, the culm being practically a pure yellow. This might rather easily be confused with *P. sulphurea*, described and illustrated in earlier pages, but is distinctly different in detailed characters. The common name Castillo bamboo for *P. bambusoides* var. *castilloni* was given in the second edition of Standardized Plant Names and I think is quite as suitable as any that might be chosen or conjured up. The plant was originally named *Bambusa castilloni*, in honor of the Comte de Castillon, by the French horticulturist Marliac, and later was called *Phyllostachys castillonis* (the final "s" was added in error). The combination *P. reticulata* var. *castillonis* was also published and is still used by the Japanese botanists and perhaps some others. The question as between the species names *bambusoides* and *reticulata* hinges on whether the giant timber bamboo, the plant we know as *P. bambusoides*, has been correctly identified with the one that earlier had been named *Bambusa reticulata*. In the light of the best-informed opinion that I have been able to obtain, it seems most likely that the two were different, in which case the correct specific name is *bambusoides*, as here used, and not *reticulata*. While the Castillo bamboo is of interest chiefly for the beautiful and striking color contrast of the fresh culms, the mature culms can be used for many utilitarian purposes with the limitations suggested for *P. flexuosa*.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Two Colorado Ferns

The traveller through Colorado (when people travelled) might well wonder how on earth ferns could grow in such a dry sunny country. They are rarely to be seen by roadsides except where Bracken covers the mountain slopes of the Rockies as it does on Rabbit Ear Pass.

Several of the commoner species, found generally in cool moist places in the temperate zone, grow along streams and in shaded rock clefts in the foothills and mountains.

There are found in Colorado two ferns which are not so widely distributed, both of them beauties:

Notholena fendleri, Cloak Fern, resembles the Maidenhair Fern of parlor windows—in the days of parlors—except that it looks less lush, more wiry, much more dainty and at the same time independent. Its wiry stems of dark brown zig-zag obligingly to where each leaf wishes to begin. The leaves are deltoid, pinnately divided and the general affect is that of many tiny flecks of bright green supported on invisible stems. "Cloak" refers to the fine whitish powder which cloaks the spores and coats the underside of fronds. This is all nothing but words! The thrill of seeing this growing in clefts of huge granite boulders usually out of reach in perpendicular rock faces is unforgettable.

It is inclined to be homesick when transplanted. One requirement—as well as the comfort of large rocks—seems to be air drainage, and it prefers shade or a north exposure.

The second of our pair is *Cystopteris montana*, an arctic fern which has wandered south to grow by Scottish

streams and, in the Western Hemisphere, to Glacier National Park. Colorado is a long way south from its home; even so it has been found in two different areas in the state. One on Mt. Princeton from which it seems to have disappeared, the other where it still grows is a cold north slope on Hoosier Pass about 11,000 feet above sea level. Here in a clearing of Engelmann Spruce is a stream from melting snow which fans out and chuckles to itself under large angular rocks. The surface is a floor of softest, greenest moss from which springs this very lovely fern. The general effect is that of horizontal, triangular fronds delicately pinnate, about a foot high. In spite of its arctic origin it grows well in the garden in a cool shady bed of peat moss, sub-irrigated, but it has not in several years attained the height or size that it does on its cool mountain home. One high spot in years of plant collecting was when we followed a Lycopodium hint and climbed to where this beautiful room in the mountain forest suddenly appeared in the slants of sunshine through the trees. The only thing possible was to sit down on a fallen log to look—and look—and look.

KATHLEEN MARRIAGE,
Colorado Springs, Colo.

January 1945

A Dissertation on rock garden annuals
In words of one syllable, strictly for amateurs.

In the use of annuals for the rock garden, one must tread carefully—just why is a subject to itself, not easily nor quickly disposed of, and open to much controversy. But the line of demarcation between suitability and incongruity



Kathleen Marriage

[See page 292]

Notholena fendleri

ity is a delicate one, and over-stepping it becomes too often a *reductio ad absurdum*.

It may be well to remind our readers that rock gardening in America is in its infancy, and due to the wide diversity of our geographical conditions, set rules for the use of plants are impossible; one man's meat is too truly another man's poison.

Curiously enough, this fact is apt to be ignored, with the result that frequently many summer rock gardens present what a witty and discriminating gardener once called "desperation planting"—a condition understandably caused by lack of definite reliable information on tried-out material. Especially must one step lightly where the rock garden is under constant observation from frost to frost and the summer season is a long one. As in our Upper Middle South, it would seem that few annuals are well known that are really suitable and which, without nursing, will provide successional fresh bloom until frost. Such as are easily available are an answer to prayer.

True, the name is legion of iron-clad annuals contributing to the ordinary summer display, but comparatively few that we know here in America are in harmony with rock garden pictures, even though so robust in constitution as to flourish under most adverse conditions. Take the petunia, for instance. No one can deny its value, and its willingness and determination to people the earth, even under neglect. But who wants a petunia among rocks? The very character of the rock garden rejects such sophistication as is present in the beautiful modern forms, so obviously "city bred."

If one could lay down a general rule, it might be "Avoid specially hybridized and perfected subjects; search for plants that come unchanged from the

wild and that haven't lost their individuality."

For my own part, after long years of studying catalogues (both foreign and home) in search of material that will flourish under adverse conditions in my tiny experimental "rock patch," I have found many that respond in various degrees to the exactions of heat, drouth, and thirsty tree roots. Some are able to take care of themselves from the beginning; some require a start in the seed box or cold frame. But in these days of labor shortages where one must get the most effect with the least work, my list of indispensable that will cover the season has shortened to a handful, only one of which requires early indoor sowing and transplanting. The others take care of a seasonal succession of bloom with volunteer seedlings which come up everywhere, and are easily set in place, and bloom at their appointed time.

Collinsia verna (a native of the Ohio Valley) is the first to bloom, starting in early April with plants from seeds dropped the previous year. There can be no appeal from the statement that it ranks among the choicest and most suitable of all rock garden material. Any one who has seen a woodland hillside bordered with sheets of blue that literally, and without poetic rhapsody, seems to be a fallen patch from the sky, will agree with this statement. Unfortunately, its own beauty has been its undoing, for indiscriminate picking by an enthusiastic and ignorant public has almost exterminated it in the wild, since it must be left to seed itself or it disappears. Fortunately the Wild Flower Preservation Society occasionally offers seeds, and any gardener lucky enough to have it will gladly cooperate in its preservation by giving seeds or a clump of young plants. "Blue Eyed Mary," as it is often called,



Kathleen Marriage

[See page 292]

Cystopteris montana

is the eastern member of the west coast *Collinsia* family, familiarly known as "Chinese Houses." It is the only one of these charming and worth-while annuals to dependably self-sow for me. The westerners must be spring-sown each year, and, moreover, not only bloom later, but haven't the length of blooming period of *C. verna*.

The color and character of the flowers are outstanding. They are quarter-inch, four-petalled blooms, resembling a miniature snapdragon or penstemon (for *C.* belongs to the Scrophulariaceae); they grow in whorls of three to

six on 4-5 inch spikes at the top of 8-10 inch stems. The flowers on 1-inch pedicels and facing directly outward have the upper petals pure white, the lower a clear, forget-me-not blue, one of the few true blues in the flower kingdom. The leaves are ovate or oblong. Seedlings begin showing in October, little, reddish, quite weedy looking, and continue to germinate till late March. The first blooms appear normally in early April, the last strong patch of color lasting till late May.

Silene pendula comes next, overlapping the *Collinsia* for about half the

blooming period. It is a true winter annual, seedlings appearing in autumn and growing into huge spreading masses of bloom in late April till into June. Unlike the *Collinsia*, which insists on winter germination, seeds of the *Silene* can be sown in spring for later bloom, though I have not found that in hot weather they make as large nor as long-lived plants. Bailey said of it that it comes from the Mediterranean region and blooms July-August. The $\frac{3}{4}$ -inch true catchfly flowers, with a longish inflated calyx are an exquisite tone of salmon pink. The foliage, oblong spatulate to lanceolate, is soft grayish. This plant will drape itself over the edge of the rocks and often makes a sturdy, upright, bushy plant against a wall background. Seedlings can be moved at any time. My first seeds came from Thompson and Morgan in 1922 and I have never had to buy more.

Sedum pulchellum, a native American, is what its name implies—a beautiful plant. It is described as a perennial by every botanist that I have been able to consult, from Gray to Lloyd Prager, and naturally, I hesitate to go against High Authority. But it was given to me as an annual, and for me it is an annual, and an invaluable one at that. The plant dies entirely when seedling is finished, no trace is left of it, and that plant never returns. But in late autumn and well into the spring, tiny intriguing seedlings begin to pop up for yards around it (especially for me between stones or brick walks) which only need to be picked up and put in any desired place. It can even be moved without flagging, in full bloom. One plant will establish future hundreds.

In color it is contradictory. Close examination of the tiny florets that are borne in characteristic claw-like clusters prove them a pure, deep rose pink.

But the leaves and stems are so determinedly a light greenish-yellow, that the two tones blend curiously and the mass effect is a good salmon pink. The individual plant, about 4 inches tall, looks like a tiny, aged pine tree, with bare trunks and spreading windswept top branches. To see this sedum in its glory, one should make a pilgrimage in late May to the Blandy Farm, the experiment station of the University of Virginia, at Boyce, Virginia, where acres of the out-cropping rocks that slope to the water are gorgeous sheets of bloom for several weeks.

In late June, following the sedum, there is a short lull in the volunteer ranks, but the Chinese *Incarvillea variabilis* (which from an early hot bed will be starting into bloom) makes a valuable and suitable contribution. This member of the Bignoniaceae is a tender perennial, but blooms early the first year from seed, and its beauty and hardness of constitution repay any trouble taken. It has lacy, finely cut leaves, makes a sub-shrub about 12-15 inches high and across, and its 1-inch trumpet-shaped flowers in white or pastel pink or creamy yellow are borne generously and steadily until frost. It likes to hang over a wall.

Cuphea miniata is the choicest member of the cuphea group, and yet is amazingly little known. It differs greatly from its relative, the tender greenhouse plant we call the "Cigar Flower," both in habit of growth and in appearance. It self-seeds vigorously, the seedlings appearing in late May, and by the first week of July, it is in full flower for the rest of the season. A botanical description gives no idea of its charm nor value. The $\frac{3}{4}$ -inch flowers have two crinkly petals of a fine cherry-red (occasionally a purplish tone crops out), with a clear fuchsia purple at the throat. Curiously enough, though definitely red (that

color so frequently anathema to the "high-brow" gardener), *Cuphea miniata* blends perfectly with either bluish or yellowish reds, even pink, and is valuable as a cut flower. The small leaves are a strong yellow-green, slightly hairy; the bushy plants, which like to sprawl, grow to 18 inches in full sun, and are smothered in bloom from June till October. It flourishes like our anathemized petunia in any and all situations.

Torenia fournieri with its variations *T. Bailloni* (yellow and brown) and *T. alba*, bring up the rear of this procession and is probably the most pliable to handle, for in addition to its normal habits of self-perpetuation, it responds to a succession of crops with very little effort on the part of the gardener. Its blooming period is shorter than any of the above-mentioned plants, but as the small, natural volunteers appear in mid-to-late summer, it contributes its bit with the early autumn bulb parade. The little "Monkey Faces" with their lavender and purple pansy-like blooms are particularly striking grown with

the deep red of *Habranthus pratensis*. The plants with their crisp, bright yellow-green foliage never exceed 10 inches in the meagre rock garden soil, and form a harmonious ground cover for the 12-15-inch amaryllids during their September bloom.

A tender perennial vine that can be depended upon to self-sow and bloom the first year from seed is *Thunbergia alata* from Africa. It can be a pest or a 100 per cent asset, for it covers much space and may have to be relentlessly weeded out to prevent suffocation of its neighbors. But in the right spot, the lovely corn-color yellow or white "Black-eyed Susans" with their black spots at their throats, bloom vigorously and uninterruptedly from their first growth in June and only cease when the frost bites the garden. Once sown, like the poor, they are always with us.

With these few "fool-proof" annuals to build on, even war-time exigencies need not deprive us of good mid- and late summer color in the rock garden.

VIOLET NILES WALKER,

Woodberry Forest, Va.

Lily Notes

GEORGE L. SLATE, *Editor*

Success with L. japonicum

About 1933 the writer began the cultivation of lilies as a hobby. The aim was first to get a collection of hardy species together and then from these to breed better varieties. Of course such difficulties as mosaic, bulb rot, and botrytis were unheard of. Likewise still to be learned were the difficulties in hybridization such as sterility, incompatibility, apomixis, etc. No sensational hybrids have been obtained to date—they are still in the future!

But no matter how many failures a gardener may have, there are a few bright spots. *L. japonicum* has furnished one of these for us. The descriptions and pictures of this lily, coupled with warnings of the difficulties of its culture, are enough to challenge any lover of lilies. Bulbs were ordered from three different sources between 1933 and 1935, and planted in strictest accordance with directions. Some never produced growth and none ever flowered.

In the meantime, seeds of *L. japoni-*

cum had been imported from Japan during the winter of 1934 (address of Japanese firm useless now). Our success with this lily started with these seeds. They were planted in a flat containing a compost rich in leaf mold. Two winters and one summer were required for germination, except that two or three pushed up near the end of the summer. The germination is similar to that of *L. auratum*, but the first leaf is smaller. In the spring, one year after germination, the small bulbs were transplanted to a frame. Here the soil was again almost pure humus.

The frames which we use consist of parallel boards about a foot high and three feet ten inches apart (inside distance). This width permits shading by lath sections four feet square. The laths are spaced the width of one lath apart and are placed in the usual way with the lath length running north and south. The soil in the frame is slightly raised to facilitate drainage.

Here the seedling bulbs remained until the spring of 1941, gaining strength each year. They were watered in dry seasons and mulched with hay during the winter. The lath shade was maintained throughout the growing season.

On July 6, 1940 the first flower of palest pink appeared and lasted five days. That was a "Red Letter Day" when we saw our first *L. japonicum* in flower and experienced a new perfume! Much praise has been given to the grace and beauty of this lily, but far too little mention has been made of the fragrance it exhales. I contend that if this lily were the plainest member of the genus, its perfume would still make it well worth-while. It is not nearly as strong as that of *auratum* or *regale*, and has a quality that must be experienced to be understood. Another pleasing difference peculiar to this lily is the manner in which the three lower petals

protrude. Perhaps they are landing strips provided for friendly insects.

In succeeding years there were more flowers, and deeper colors, but none so far have approached a rose pink. In 1941 the flowering season was from June 30th through July 15th, and in 1942, from June 23d to July 22nd. A still further delightful characteristic of this lily is this long flowering season, which, of course, is partly due to the larger number of bulbs that flowered.

In the spring of 1941 we moved to our present location, where we have twenty-two acres of rocky woodland, with exposures to all points of the compass, and a wide range of soils. During the hubbub of getting a house built and moving a considerable collection of perennials, shrubs, bulbs, conifers, etc., besides clearing a garden space, the lilies were somewhat neglected. Everything had to be done with a slapdash, a pat, and a promise!

L. japonicum, however, merited attention. There is a pond in our woods which has a hard clay bottom covered with an accumulation of well-rotted leaf mold. This pond dries up in the summer. During the preceeding summer several wheelbarrow-loads of this were piled up to dry and air out. Three beds were prepared, each about a foot deep, and filled in with this leaf mold, using no sand or other admixture. Two beds were made level with the ground and one was slightly raised. The amount of shade (from tall trees) varied from forty to seventy percent.

The bulbs of *L. japonicum* are white; and these, when planted early in the spring of 1941, were small, few being over one-half inch in diameter. They were planted closely, about three inches deep, in rows four inches apart, and the beds were surrounded by chicken wire to discourage the woodchucks and rabbits. About ten plants flowered that year, and more in 1943.

Last spring (1944) a new bed was similarly prepared at a lower level and the second and fourth rows were moved *after the shoots had pierced the ground!* By using a spade, the bulbs were not disturbed, and they flowered well. This spring they look better than those not moved and have a larger proportion of buds. Incidentally, this newest bed is about one foot above the water level of a winter pond less than twenty feet away.

The writer was led to believe that *L. japonicum* demands considerable moisture in the soil, by that monumental article by Dr. F. Stoker, "The Environment of Lilies in Nature" (R. H. S. Lily Year Book, 1933, Pages 11-54). From page 44 I quote in part:

"*Lilium japonicum* Thunberg (Syn. *Krameri*)—trees, shrubs, dwarf bamboos; half shade. Moist humid soil by river banks, rocks, roadsides, woodlands, with good drainage (Wilson). Rainfall large—humidity 65-85%. Temperature 30-70°."

The expression "good drainage" probably has mis-led many persons to use excessive sand when growing *L. japonicum*. Personally, I have not found any lily that is benefitted by the use of sand. A soil can be well-drained and still be retentive of moisture. The English climate perhaps requires more attention to drainage.

With seedlings, numerous combinations of soils, shade, exposures, etc., can be tried, until the best combinations are found. Of the three beds planted here the driest was unsatisfactory from the first. Today there are left only two short non-flowering spikes and a few single leaves. The other two of the three original beds have done well. The one which was slightly raised now has the most light (about 60%) and is making the best showing this year. It has the most robust spike—

but not the tallest—and the largest percentage in bud at the present date (June 6, 1945).

For plant food nothing has been used except low-analysis commercial fertilizer broadcast between the rows early in the season. No winter mulch is used except the falling leaves which collect naturally. No winter or spring frost damage has ever been experienced. This lily is *not* tender.

Seed sets freely—practically every flower will produce a full capsule—if permitted. The seed ripens slowly and is seldom mature before Thanksgiving. We used to worry about frost damage, but the cold seems to have no bad effects whatever. We have been saving seed only from one or two of the best flowers and now have three lots started; all planted and left completely outside.

Following are the maximum dimensions of the two best flowering stalks: one, the tallest, growing in about 70% shade, the second, the most robust, in about 40% shade. The tallest has narrower leaves and is lighter green. Each shows one bud. Maximum height, 2 ft. 3 in.; longest leaf, 6½", located 11" from ground; number of leaves, 12; maximum width of leaf, 1"; nerves, including mid-rib, 3; stem diameter at ground, 3/16".

Never—including this season—has there been more than a single flower per spike. Also there has always been a large percentage of non-flowering spikes. Today, there are only twelve stalks which show buds out of about fifty that are of flowering size. I have noted this same condition in the picture of a group of *L. japonicum* growing in California. Yet other pictures of a single plant usually show more than on bloom. Probably we have been giving too much moisture? Is the soil wrong, or have we a poor strain of this lily? Now that the rabbits and

woodchucks have been pretty well routed, and there is more time, we plan to spread our plantings around to check these conclusions. We would greatly appreciate the opinions of anyone who is interested.

Thinking that our seed might be of an inferior variety, we secured seeds from another source, but today the two-year seedlings are much smaller than plants of the same age from our own seed. There is a variety, *platyphyllum* or *platyfolium*, which should be stronger.

No difficulties from insects have been experienced except from a small snout beetle of undetermined name which insists on eating scallops all along the margins of the leaves. This pest seems most partial to *L. japonicum*! So far it has proved more annoying than destructive. We keep it in check by handpicking the beetles late in the day.

We hope no one will be discouraged from attempting to rear this lily from seed by anything said in this article. Everyone can supply humus and everyone can provide shade artificially or otherwise.

By growing seedlings, re-selecting, trial and re-trial—here in North America—we shall gradually acclimatize and improve on this beautiful and fragrant lily. We can never get anywhere by importing the soft and perishable bulbs.

RALPH M. WARNER,

Woodmont Road, RFD No. 1,
Milford, Connecticut.

Sulphureum Lily not Reliably Hardy

The Sulphureum lily (*Lilium myriophyllum*) is the largest of the trumpet lilies that can be grown successfully in this region but it is not reliably winter-hardy. Farther north (Vermont) where the snows come early and remain until late spring it winters over as well as other lilies. I obtained three bulbs of it 15 years ago and they produced several immense flowers on stalks 5 to 6 feet tall, but sub-zero temperatures one winter proved more than they could stand. A few years later I planted six bulbs in a border along the south side of a building but none came up the following spring. Then I bought two more and planted them in 9-inch flowerpots which were sunk in the ground in the spring and brought into a cool cellar in the fall. One was planted eight inches deep the second fall and mulched with six inches of peat moss but it never showed up. The other has borne two fine flowers each year and produced many bulbils. These are placed in a flowerpot of sand and soil and carried over winter in the cellar. They sprout in early spring and, when the weather is favorable, they are lined out in a frame to grow during the summer, and are returned to the cellar in the fall. This lily is so gorgeous that it is worth while going to the extra labor to get it to bloom.

EDWIN C. POWELL,
Maryland.

A Book or Two

Weeds of Lawn and Garden. A Handbook for Eastern Temperate North America. By John M. Fogg, Jr., University of Pennsylvania Press, Philadelphia, Pa. 1945. 215 pages, illustrated. \$2.50.

Gardeners whether they will or no, come sooner or later to an understanding of weeds, but their knowledge may be born only out of that hard and elementary teacher, Experience.

This book is written "with the hope of enabling the gardener to identify the most common weeds of lawn and garden. . . ." It is written by a botanist who has preserved the underlying organization of his science by presenting his material in the Engler and Prantl family sequence, but has obliged the amateur or non-botanist by presenting the plants with their common names within these families. The scientific names are given but not the authorities, though one may find them by reference to Gray's New Manual of Botany 7th edition. This reviewer regrets this, since this book, both in its preliminary text and in the herbal-like body is an infectious as well as persuasive document for the evolving amateur.

Many readers may treat this like a Chinese book, reading backward (to us) from the picture section to the foreword. This will be a mistake, but whether you start on page 201 or page 2, do not skip a word.

A word must be said for the drawings which are not only faithful but beautiful in themselves, at times with the same fortuitous charm that marks the earliest woodcuts, and resulting from a too complete presentation of venation. They are in black and white, drawn with a firm but sensitive pen.

They are the work of Léonie Hagerty.

This is a very nice book, one to which you will return with pleasure. The reviewer himself, having just slaughtered some hundreds of young poke weeds (an annual rite), a beautiful crop of daisy fleabane, a galinsoga or two (these are almost beaten) various crabgrasses and so on, not forgetting the really beautiful patterns of Mollugo, particularly enjoys the line ". . . there is no panacea, few short cuts, and no real substitute for just plain weeding." He would have liked a line or two on composting since most of us are not so good that weeds are all slaughtered at birth, and a word or two about which, when pulled must never be left to die in place, since they have fabulous powers of rerooting!

Vegetable Dyes From North American Plants. Douglas Leechman. The Webb Publishing Co., Book Division, St. Paul 2, Minn. 55 pages. Paper cover \$.60, cloth \$1.25.

This is a small manual, simply and clearly written, intended for the use of "handicrafters" but presented in such a form that it can be read with interest even by those who have not the faintest intention of dyeing anything.

The gardener may well look with a more discerning eye on the plants, not so much of his garden perhaps as of his familiar country side.

It is a book to hold in one's hand while he works with the other.

Dr. Leechman, the author, "outdoor hobbyist, naturalist and archaeologist, is a staff member of one of Canada's most important museums and was for many years the editor of The Canadian Field Naturalist."

Modern Farmers Cyclopedia of Agriculture. E. V. Wilcox. Orange Judd Publishing Co., Inc. New York, 1944. 497 pages, illustrated. \$4.50.

As can be guessed from the number of pages, this is a well compressed treatment of many things. Its sections are: Field Crops (44 entries), Garden Crops (44 entries), Fruits and Nuts (53 entries), Beef Cattle and Dairying, Other Live Stock, Poultry, Drainage, Fertilizers, Irrigation, Soils, etc., and Miscellaneous.

The style is clear and succinct and should provide the exact type of reference book for the farmer in nearly every emergency.

The Field Seed Industry in the United States. Frank Victor Beck. University of Wisconsin Press, Madison, Wisconsin, 1944. 230 pages, illustrated. \$3.00.

"The author, Dr. Frank Beck, is economist of the Field Seed Institute of North America, an organization for the promotion of research on field seed production and distribution."

This suggests as good an expression of what one may expect as anything else. For the seller's and grower's eye rather than the consumers.

Southern Field Crops Management. E. N. Fergus, Carsie Hammond and Hayden Rogers: Edited by R. W. Gregory. J. B. Lippincott Co., Philadelphia, Pa. 1944. 725 pages, illustrated. \$0.00.

"This book is designed to be of use to those engaged in, or who expect to engage in, producing field crops, in the South. Crops not limited to the South are discussed from a national stand-

point. * * * Not only is material in specific crops presented, but the book has a chapter on 'What Crops to Grow' etc. . . ." Apparently there were endless advisers.

Pictures have been borrowed from all directions. Corn, cotton, tobacco, small grains, hay crops, and so on—not forgetting the inevitable song for soil conservation and a passionate page or two for Kudzu.

New Crops for the New World. Edited by Charles Morrow Wilson. The Macmillan Company, New York, 1944. 295 pages, illustrated. \$3.50.

This is a most interesting if sometimes an unsatisfactory book. It is made up of sixteen shorter or longer pieces by fourteen different people all with different backgrounds of experience, both here and in Latin America, for the "New World" of the title is made up of our Americas and does not mean a new "global" world, or at least not yet.

Some of the copy is born of business, some of government work, some of pure compilation. Some of it is much more complete and factual than some other parts. Some is tintured by opinion, some is touched by caprice and some is on a purely "take it or leave it" basis.

Whether you are interested in Latin America or not, whether you hope to enjoy material imported from our sister republics or prefer to go there to eat "out of hand," read the book.

If it had no other virtue, and it has many, it has the particular virtue of the radio. If you don't care for the author or the subject matter, you may turn him not off but down, and pass on to the next and all this without spoiling the story.

The Gardener's Pocketbook

*From the Midwest
Horticultural Society*

Cercis canadensis alba.

While the redbud has been well known for some time and has taken its place as a standard item in the nursery trade the white form is not known and is offered by scarcely more than a half dozen nurseries. Apparently the white form is restricted in its occurrence to the Ozarks of Missouri as the reports of it have come from there mostly by way of the Missouri Botanical Garden. Several specimens have been found. One of the first finds was studied by the staff of the Garden and successfully propagated. Material was then disseminated to some nurseries and to-day there are some half dozen widely scattered nurseries supplying the plant.

In normal appearance there is little to mark the white flowered form. Possibly a trifle lighter color of the foliage, and no red tinge on the petioles. The flower buds are greenish white and lack the red color of the species. All parts of the flower are a pure white.

Cultural handling of this variety is no different from that of the parent species. The use of the plants with a ball is desirable as redbuds sometime die back to the root and this would be catastrophic in the case of a grafted plant.

This is a striking plant if flower and in combination with the rosy normal color would greatly enhance any landscape.

Certainly this is one of the plants worth hunting for.

Kerria japonica

This interesting low shrub is one that apparently has not been extensively used. It is listed in practically

all catalogues but rarely shows up in gardens.

As a garden plant for facing shrubs of taller stature or for use as a low informal hedge *Kerria* has much to recommend it. The foliage is a vivid green with rugose veins, and is very ornamental. The small branches and most of the old ones are a bright green that remains so all winter. It is a bright green reminder of spring against the snow and ice. The flowers are bright yellow and resemble buttercups in size and shape. They appear in the middle of May in normal seasons. There is a double form in which the flowers resemble golden balls.

Culture is as for most shrubs. A fair soil, with full exposure or light shade, and pruning to remove old stems. Propagation in the garden can be effected by the removal of the stems which creep a short distance from the clump. These do not spread so rapidly as to cause the plant to get out of bounds.

This neat little shrub has much to add to many gardens where bright green and gold can be used. For winter color this is tops.

Deutzia gracilis

The choice of low shrubby material for the Middle West does not give a great deal of variety. One shrub that has the habit of low stature and sufficient hardiness is the Slender *Deutzia*. This plant like the larger *deutzias* is not particular as to soil or location. It will do fair in rather heavy shade or in poor soil but reaches its best development when given better opportunities.

This plant is listed as growing to six feet in some works but the height of two feet as listed in others is closer

and is the height of those that I have observed. The plants are rather spreading with small branches. The flowers are white in small racemes and produced in early spring.

This could be used as a foreground shrub to face taller material or as a low hedge either trimmed or untrimmed. The foliage is about $2\frac{1}{2}$ inches long and a bright green. Probably the size of the foliage would not lend itself to extremely close trimming without giving a chopped effect but as a hedge trimmed before leafing out and with occasional pinching of long shoots it should give a neat appearance.

Five-leaved aralia

This neat shrub which is very useful for shady situations has had a taxonomic history that is confusing and still adds to the difficulty as the older name still occurs occasionally and the common name is merely a translation. At the present this is placed in *Acanthopanax sieboldianum*, but formerly was known as *Aralia pentaphyllum*.

While supposed to reach ten feet in height this is seldom attained in this region as the plant is generally used in shady and difficult situations that would tend to slow growth and reduce ultimate height.

In small plants the branches are erect and the plant has a rather columnar appearance. With age the branches ascend and then arch outward giving a round topped shrub from a compact base.

The leaves are five parted, about $2\frac{1}{2}$ " in diameter and a dark glossy green. The flowers are small and white and are not generally conspicuous enough to warrant much attention.

While the ability of this plant to succeed in shady spots has been mentioned it will grow better in open situations. Soil conditions should be moderate. Propagation of the plant is effected by

removal of the side stems after they have rooted or by cuttings which are not always so readily rooted.

There seems to have been a dearth of this species in the lists this spring, but once the labor situation eases, no doubt this will find its way back in.

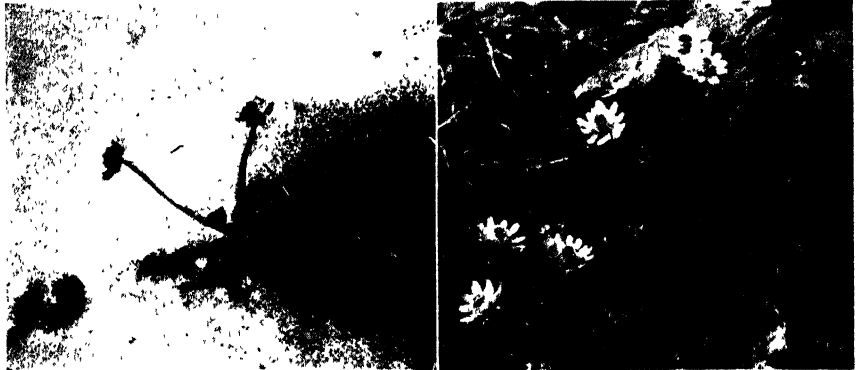
ELDRED E. GREEN.

Ranunculus cooleyae

This charming little flower which grows among the snows of the Alaska Mountains, was named in honor of Miss Grace E. Cooley, instructor in Botany at Wellesley College, Massachusetts, who collected the plant in August, 1891 on a trip to Alaska. She found it in fruit among loose rocks near the top of a snow-covered ridge, not far from the city of Juneau. In August, 1892, it was collected in flower near the top of a bare, 3,000 foot mountain of the Saint Elias Alps, above Disenchantment Bay, Alaska. Mr. Frederick Funston, the finder, says that the plant is rare and he was able to obtain only five specimens. It is, however, still growing in its mountain haunts as these photographs were taken recently by Mrs. Maxine Williams of Juneau.

The yellow flowers grow on 1- or 2-flowered scapes, naked or bearing a small leaf near the middle; the scapes when in flower about the length of the leaves—1 to $1\frac{1}{2}$ inches—later 8-10 inches in height. There are many root leaves, orbicular, on short stems. The leaves are deeply 3-parted, each division again 3-5-parted, the lobes oblong, obtuse, granular-tipped; sepals 5, oblong, obtuse, deciduous, smooth. There are 10 oblong yellow petals, tapering at the base into a slender claw. Stamens are numerous; carpels numerous in a close head, strongly compressed laterally. Style short, reflexed.

This is one of the flowers which is not intimidated by Alaska's snows, producing its blossoms, as our eastern ar-

*Maxine Williams**Ranunculus cooleyae*

butus does, directly from its snowy refuge. It blooms in August

SARAH V. COOMBS,
Scarsdale, N. Y.

An Annual Report

Some flowers are perennial in the South but perform like annuals in our gardens in the Middle West. Others are biennial but might well be called winter annuals and then there are those which are strictly annuals in every sense of the word.

Collinsia verna, the dear little Blue-eyed Mary, is a charming winter annual of the Figwort Family that blooms in late April or in May. Seeds are sown in August in a semi-shady spot if possible although it will bloom very satisfactorily in a sunny location. It takes several weeks for the seeds to germinate and they make little fall growth. But they winter over perfectly and awaken early in the spring and are budded almost before some of the lazier perennials have even raised their heads. A bed of them planted thickly is a checkered mist of blue and white two-lipped flowers in whorls of five to six blossoms and three or more whorls to a stem. They self-sow very satisfactorily.

Another early blooming flower which is a biennial but which might well be classed as a winter annual is the English Wallflower Fire King. There are many varieties of Wallflowers but Fire King in a glorious orange. I sow the fresh seeds in August. They germinate in less than two weeks' time and make fine clumps by the end of the growing season. In the spring they grow rapidly and just now as I am writing this on May 15th, they are in all their glory—like so much golden sunshine on even this dark day. They are in bloom for many weeks and are so delightfully fragrant. One really has to see them in full bloom to fully appreciate them and to be able to realize their great desirability. Such plants as double Larkspurs, Iris and Heartsease in blue-purple shades planted near them are lovely. Also Hemerocallis and Tulips in orange-yellow colors.

What are Pansies? Annuals, biennials or perennials: Use them as winter annuals, planting the seed in August and enjoy their luxurious blossoms from late March on while someone else wrangles over their botanical classification. Buy seeds of the large-flowered strains and plant them in a well prepared seed bed. They must not dry

out during the first ten days or you will have no Pansy plants. Burlap sacks or lath covers for shade will make it easier to keep the bed just moist for the best germination results. It is well to keep the young plants shaded during the hot hours of the day until cooler weather comes. Thin them out if the plants are too thick. In the Spring when they commence blooming pay no attention to the "pick-your-Pansies-every-day-if-you-want-to-keep-them-blooming" advocates. Pick only the blossoms wanted for button-holes and bouquets and leave the rest on the bushes to provide beauty to the border. A Pansy during favorable growing weather is much larger by the 4th day than it is the day it opens. Keep the faded blossoms snipped off regularly to prevent seed formation and your plants will continue blooming if they have plenty of moisture.

Another plant classified as a perennial but that has all the earmarks of an annual or winter annual here in the Middle West is the *Eryngium leavenworthii*. It is a most unusual plant as to coloring as the entire plant is a glorious purple in the fall. It retains this lovely purple color when dried if cut at just the right stage and is thus useful for winter bouquets. The seeds are very independent. We plant them but have no idea when they will decide to grow. Sometimes they come up quickly when planted in the Spring and again they lie in the ground until the fall rains come. These plants then act as winter annuals, most of them wintering over quite well and blooming the next fall. The flowers in themselves, however, are nondescript—it is the rare purple coloring of the burs, bracts and leaves that makes it so attractive.

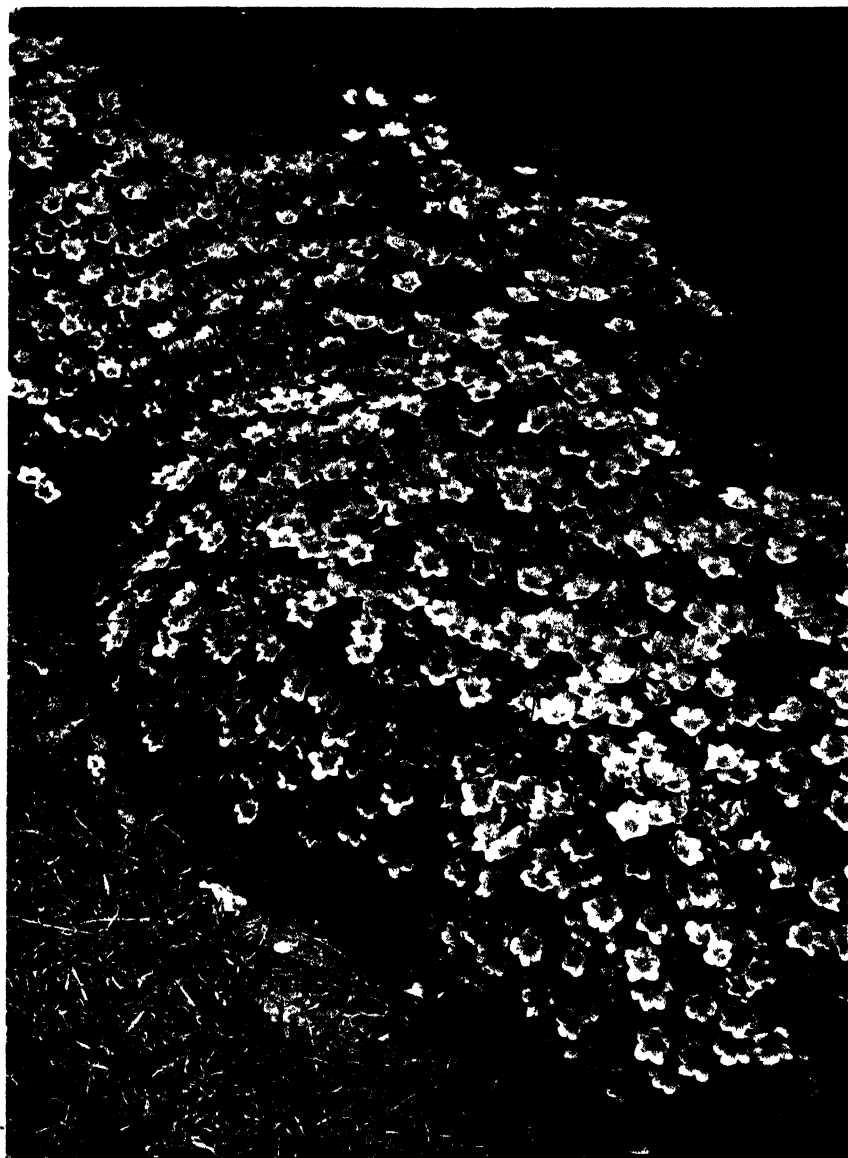
The Cup Flower, *Nierembergia hippomanica*, is a very desirable flower for a somewhat hot and dry location. We use it as an annual here although far-

ther south it is no doubt a perennial. The variety Purple Robe is a much deeper color than the type and does not fade. They are lovely planted in front of orange Lantanas which can also endure the same sort of location and bloom just as profusely as the Cup Flower. The Cup Flower may be grown from seeds or from cuttings.

Marigolds are one of the most satisfactory of the annuals. There are so many varieties that it is hard to choose when space is limited. I am particularly fond of the tall kinds and make them serve a double purpose. By planting them close together on the south side of beds, they make a fine "heat-break" for plants that require sun yet appreciate having hot south winds diverted. When used for this purpose they must certainly be staked as they are such shallow rooters that hard winds and rainstorms tumble them "every-which-way" and thus they would not serve the purpose well. The mum-flowered types come in dwarf and tall forms and are especially lovely. If one has Marigolds of various kinds one can be quite sure of flowers long into the fall—in fact until Jack Frost really takes over.

The well-known annual Sweet Alyssum in white hardly needs description, but it is one of the old standbys that we can always count on for snow drifts of bloom for weeks and weeks and a garden border hardly seems complete without it. Some gardeners report that the seeds germinate poorly or not at all. Perhaps the secret lies in planting the seed early and covering very, very lightly.

There are annual vines that should be in every garden. If you wish to welcome the humming birds, plant Cypress Vine for them. They like the Cardinal Climber, too, but flutter more around the Cypress Vine. For our own joy we should not be without the Heavenly



© J. Horace McFarland Co.

Nierembergia, "Purple Robe"

Blue Morning Glory. The big blue blossoms almost outnumber the leaves in September when it is at its best. Plant it near the Marigolds for a good color combination. Some may hesitate to plant it because it is a Morning Glory and might become a pest but in this section we worry for fear no seeds will ripen for next year's planting. There are some volunteers occasionally but never enough to warrant putting it in the pest class.

There are many other annuals that we use to fill in the gaps like *Phlox drummondii*, *Salvia splendens* and Larkspurs. We would miss them like old friends if we did not have them in our gardens every year but these are surely all so well known that they do not need description.

OLGA ROLF TIEMANN,
Westboro, Missouri.

Cornus kousa

During our strenuous winter season I get several months behind in my horticultural reading which accounts for my not until now having noticed your request relative to *Cornus kousa* on page 180 of July 1944 magazine. We have grown it here nearly 20 years, having originally received seed from University of Nanking in 1926. We like it here particularly well because due to the alkalinity of our soil and water neither the eastern *C. florida* nor our own *C. nuttalli* thrives well unless the soil is artificially acidified. Our old specimen seems to be thoroughly at home here, flowering freely and developing fertile seed. The total width of the "flowers" is about 6 to 7 cm. The acuminate bracts are cream colored when fully developed but with a little age they become heavily stained red. We have also propagated quite extensively the variety *C. k. chinensis* but have never planted out a specimen so have never seen it in flower. Judg-

ing by your illustration the bracts are more broadly ovate but somewhat less acuminate in the variety than in the species.

W. B. CLARKE,
San Jose, California.

Zoysia matrella

Zoysia matrella was first sent to the United States from Japan by David Fairchild in 1902. It was called Biro-doshiha by the Japanese and was used in rock gardens.

It is a well-known lawn grass in the extreme south. As it is a tropical grass it was not known whether it would be hardy in this section. But as it was known to be hardy at Auburn, Alabama, it was decided to test it as a lawn grass in northeastern Oklahoma.

Its rate of growth is very slow. This is a decided drawback when establishing a lawn, but its best feature once the lawn is established. A neat appearance may be kept by mowing once a month. As it does not set seed readily in the United States increase is by stolons. They are quite fine, very tough and nodes are about one-half inch apart. It makes a very thick firm turf that does not encroach rapidly upon flower borders. For this section this is its greatest recommendation. African Bermuda and common Bermuda, the usual lawn grasses, run into flower beds with such amazing rapidity as to necessitate weekly or semi-monthly clipping around borders. Two clippings a year are sufficient to keep *Zoysia* from the border.

Spring planting is to be preferred to fall planting. By close sprigging good coverage may be had in about four months. Sprigging is begun about the middle of April and continued into early August if there are surplus stolons. Later sprigging has not proved satisfactory as the grass does not become established quickly in cool weath-



W. A. Taylor

Centennial Pecan Tree, October, 1902 (see page 213, July, 1945)

er. Close sprigging has proved more satisfactory in getting quick coverage than planting small tufts.

Zoysia starts to become green earlier than Bermuda grasses and is much more resistant to frost. Upon close inspection it is partially evergreen even in midwinter. Plantings where a great deal of humus has been added remain about 33% green at temperatures not lower than 15°.

New plantings are kept free of weeds to encourage rapid growth. When established very little weed growth is possible. It has not choked out clover. Recently it has been recommended that Zoysia lawns containing patches of clover be given an application of high nitrogenous fertilizer in hot weather. This is reported not to injure the Zoysia, but burns the clover to such an extent that the Zoysia can choke it out.

Recently commercial plantings have been made in Connecticut where it is being sold under the name of Flawn.

ELEANOR HILL,
Tulsa, Oklahoma.

Cornus florida (See page 311)

It may seem almost banal to publish a picture giving natural size details of flowering branch of our Eastern Dogwood, and the captious may well point out that the picture must have been taken when the flowers were fairly old since all of the flowers are open, and the leaves are developing about and below the white bracts. This is only too true, but as excuse there can be said only that the season of 1945 was very curious with premature heat, then cold and rain, that turned all seasonal flowering topsy turvy so that the dogwoods which hereabouts do flower before the leaves are well developed, in most cases exhibited flowers sitting on collars of green leaves long before the bracts began dropping.

It is also repetitious to remind gen-

eral readers that one may have considerable profit and pleasure in studying dogwood trees in any area where they are abundant to observe the size, shape and carriage of the floral bracts. In my own particular area this is a game one can carry as far as he likes since the flowering dogwood is a weed tree to all purposes. The illustration was chosen from the individual plant which showed the best bracts, among those in flower and in condition for photographing. There are on the hillside, individuals with even larger bracts, or perhaps longer rather than larger, some in which the length is less and the width greater which tends toward a round flower and possibly greater whiteness. One tree has produced for years, flowers in which the bracts do not lie flat but stand up like incurving curls their tips almost touching over the true flowers in the center. It is neither showy nor beautiful.

Never has it been the luck or fortune of the writer to come upon a wild tree with pink tinted bracts. Several have been found which showed a tinting on the margin, but not enough in intensity to warrant the propagation.

As far as can be told from natural processes, seeds which fall naturally to the ground, or which are planted in the open, with no protection save what might come from falling leaves, germinate in late April and May. If they can be given any sort of attention they will make fair sized plants before frost. If one will learn to recognize the cotyledons of the dogwood seedling, he can soon transplant as many as he likes, lifting them with the same care that he would use in transplanting any other garden plant into a bed in which the acid soil has plenty of food and humus. Here with watering, even more astonishing growth will follow. If continued attention is given, the trees will flower sparsely in the fourth year.



Robert L. Taylor

[See page 310]

Flowering dogwood, Cornus florida

Most of the gardeners of the immediate neighborhood, who are far better weeders, never find the young dogwoods as they germinate but it is not a trick and among the other trees with which they have to contend, the only one that causes any possible confusion in the cotyledon stage is the sour gum, but as soon as the first true leaves appear, even the most hesitating should have no further doubts, since the very first dogwood leaves are unmistakably just that.

Another bit of useful information in moving dogwoods, is to remember that the foliage usually does not develop normally during the first summer but after pushing out, stands still at about one third size. This is perfectly safe and proper development will come the following season; one can take matters into his own hand however, and prune the tree violently after these leaves have shown that the tree is growing, and with good watering the then naked tree should push out into good growth. The one trouble in this is to do the job of pruning so skillfully that it will not show in the future development of the plant. Dogwoods tolerate pruning well and the person who is willing to study the branching pattern of the tree can soon learn where and how to cut so that little will show of his handiwork.

Cotoneaster salicifolia (See page 313)

Cotoneasters as a group have been known in gardens for a long time but the genus came in for considerable attention when seeds of various species came back from the various explorers, mostly British, who were ransacking China for ornamentals.

If one were to make a search through catalogues in this country, even going back before the present war had laid such a restraining hand on the production of nursery stock and all the nurseryworkers had not escaped to war in-

dustries, one would find a relatively small number of species and forms offered for sale.

There are a good many reasons for this. Many of the more attractive forms, evergreen or semi-evergreen are not too hardy to cold. The nurseryman does not like them particularly well since they are not the easiest plants to transplant and unless they sell while they are still small, they can be more economically pulled up and destroyed than saved. In areas where pear blight is common, many will succumb.

For those of us who happen to like the plants and are willing to work to have some of them, guarding against pears, buying small pot plants or raising our own things from seed, they are worth the trouble.

This particular species, which is so variable within its limits that the botanists have separated and described several charming forms is one of a group of more or less similar plants which are all beautiful. *C. lactea* is a more robust but more tender member of the series, *C. Henryana* a somewhat less compact member, but *C. salicifolia* in its several forms is worth the attention of any gardener who has room in the shrubbery border. It needs room for both height and spread, certainly eight feet in each direction. In the beginning it will look rather thin, but as the framework fills out and the lesser branches complete the pattern it is a lovely sight even when there are neither flowers nor fruit to give it point. The flowering is abundant, and is well enough shown in the picture. The berries are a good deep crimson scarlet and persist well into the winter. The typical twig arrangement of the plant is shown in the illustration and it should be recalled that the larger branch shown is a secondary branch from a main stalk rising from the crown.



Robert L. Taylor

[See page 312]

Cotoneaster salicifolia

Wanted!

In the July issue of the magazine, there was published an announcement that there would be carried hereafter, lists of "wants" from members. The person caring to reply is requested to write directly to the member making the request.

Plants wanted, all at once, or a few at a time; cuttings, cions, or seeds welcomed, if plants are not available:

Abies alba, silver fir; *A. alba compacta*; *A. Veitchii*, Veitch fir; *A. balsamea* Hudsoni; Apple, Cox's Orange Pippin (English); *Chionanthus retusus*, Chinese Fringe Tree; *Cotoneaster Dammeri* or *humifusa*; *Davidia involuta*, English strain. *Galax aphylla*; *Gaultheria miquelina*, Japanese variety; *G. Shallon*, salal; *Kalmia cuneata*, mentioned NHM. 4.41 p. 143; *Larix sibirica*, Siberian larch; *Mahonia aquifolium*, Oregon Holly grape; *Picea sitchensis*, Sitka spruce; *P. abies pygmaea*, Dwarf Norway spruce; *P. omorika*, Serbian spruce; *Pinus nigra Hornibrookiana*, Dwarf Austrian pine; *P. monophylla*, one leaf pine; *P. aristata*, Bristle cone pine; *P. strobus prostrata*, Prostrate white pine; *Pseudolarix amabilis*, Golden Larch; *Pseudotsuga Douglasi globosa* or *densa*, Dwarf Douglas fir; *Rhododendron canadense*, Rhodora; *Shortia galacifolia*, Oconee bells; *Torreya nucifera*, Japanese Torreya; *Tsuga canadensis microphylla*; *Vaccinium crassifolium*, mentioned NHM 4.41 p. 143; *Vaccinium Vitis-idaea* var. *minus* mentioned NHM 7.44 p. 171.

R. M. WARNER,

RFD No. 1, Woodmont Road,

Milford, Conn.

I should very much like to find a source of supply for the Gesneriaceae. I know of sources of seeds for *Chirita*, *Corytholoma*, *Streptocarpus* and plant sources for *Saintpaulia* and *Gloxinia*,

but *Achimenes*, *Naegelia* and *Isoloma* seem to be very scarce. I do not like to send for too many catalogues. If you could help me, it would be greatly appreciated.

(MISS) ELSIE CORDTS,
813 E. Mineral Street,
Plattesville, Wisc.

For years I have been searching catalogues and gardens for the double flowering form of Sweet Rocket, said to be very charming. Can you suggest where seeds or plants may be bought?

(MISS) ROSAMUND DANIELSON,
Putnam Heights,
Putnam, Conn.

Plants wanted, or exchanges if desired:

Ixora, rose, pink and salmon; *Bryophyllum uniflora*; *Hoya*, amethyst, rust and "imperialis"; *Dipladenia* vine, rose and white forms; *Rhodochiton* vine, purple; *Maurandia*, vine, white, blue—rose; *Clitoria* vine, double blue; *Jacquemontia* vine, blue; *Selaginella wildenovi*, blue leaves; *Antigonon*, with small wild-rose bloom, not *leptopus*.

(MRS.) MARIAN A. McADOW,
Osprey, Florida.

Wanted, plants of the double flowered forms of *Hesperis matronalis* particularly the true double white and the true violet form, in single and double, if the latter exists. The grayed-magenta roadside form is *not* meant!

MRS. CAMPBELL HARVEY,
Orchard Lake, Michigan.

List of plants wanted, for publication should be prepared as above and sent to the Editorial Office, 821 Washington Loan and Trust Bldg., Washington 4, D. C., whenever they are ready. They will be published as soon after receipt as possible.

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Lester Rowntree

[See page 3]

"It takes a rugged constitution . . ."

The Joy of Growing Plants

L. H. BAILEY

The shadows of life grow long. They stretch back over eventful and confusing years. Great wars have been fought, the difficult discussions of peace spread their alarms, old friends have died, new names have come on the stage of life, accustomed ideas have vanished, and new subjects engage the people. Yet my plants remain, full of vigor, bright in their colors, bringing memories and mementoes of other lands; and they are silent.

These plants are desired for the joy and the surprise of growing them. The wonder of it grows with the years—how an inert item called a seed can spring into life and from it come an aspiring organism true exactly to its own kind and relationship even though planted half way around the world from the place of its origin and in soils and climates wholly strange to it. This is a perpetual miracle, none the less amazing because we are now so inquisitive about it with microscope and retort.

There are other incentives. It appears to be my part to try to understand the original species from which these plants come, so that we may know relationships and keep the records straight. I try to grow the novelties for this purpose; and to this end good herbarium specimens of all of them are made and permanently preserved, for reference and study.

My garden is small in the midst of a city, yet I have grown as many as eight hundred different things in it in a single year. I like to grow all kinds of a group or genus, and then devote the area to another group for a year or two or three, the former items having been discarded. The garden is in per-

petual change and is never orderly and showy. In this way I have grown all the tribes of pinks, of campanulas, of aquilegias, armerias, aconites, and others. This year I have had several outside fields devoted to pumpkins and squashes and gourds, some of them in Florida, Louisiana and southern California. For many years I have thought myself informed on the species of these plants; but now as I grow them from Mexico and Bolivia and Argentina and otherwheres I am convinced that we are far short of understanding them as to their species.

All this work, with herbarium specimens, photographs, seeds, notes is botanical, and may be uninteresting to the horticulturist, and of course it cannot be popular in nature; yet the plants I work with are in great part horticultural, and I consider myself still a horticulturist as well as botanist. I do not now grow plants for display or for exhibition or for competition or for publication in the gardening journals; my fascination lies in other lines, and I publish my conclusions as technical contributions.

One of my satisfactions is what I call a box-garden. It is a crude affair on a slope to the south, of four runs or rows between boards on edge and cross-pieces, making sixty compartments or boxes about 12 by 15 inches. A roof or screen of wire mesh is put over it in summer, to protect from dashing rains and scorching suns and early autumn frosts. These boxes are always full of something or other; this year half the boxes have grown things of which seeds were sent from South Africa; I do not yet know what all of them are. It is now early October, and

already seeds from here and there are dropping into containers to be planted in the box-garden or elsewhere next spring, and no questions asked.

As example of the scant knowledge of the natural species involved in origin of horticultural varieties I cite the case of the brambles. Here are all the cultivated raspberries, dewberries, blackberries. I have grown many of them. Most of the blackberries are known to be from stocks native in this country. For many years I have been making collections of herbarium material in this genus *Rubus*, and at present have more than 27,000 mounted sheets of them; effort has been persistent to make specimens that really and truthfully represent a blackberry bush or a dewberry vine. For the past five years I have given special attention to a monography of North American *Rubus*, and the last fascicle of the publication is now on the press. Heretofore we have recognized about 80 species of *Rubus* in North America, but now I have described about 400 species, new and old. Much breeding has been undertaken heretofore in *Rubus*, but the published results as to specific parentages will now be of little avail. Per-

haps future breeding may have a somewhat accurate basis. Of course some of the horticulturists and botanists will not accept the new species I have described, but that will make no difference with the facts in nature. Some writers undoubtedly will reduce the number, making some of them synonyms or duplicates of others, which may be easier than trying to understand them; but the practices in crossing and breeding must in any case take a new turn.

One of the outstanding satisfactions in the growing of plants is to know what you have. Every one of the main groups of cultivated plants undoubtedly abounds in errors. Somebody must attempt to straighten out the nomenclature and relationships; this requires slow and patient study. It defines the bases of horticultural work.

The joy of growing a plant lies in the mind. Therefore we understand why every person finds satisfaction for himself or herself, in any neighborhood or climate. It should be part of public education to stimulate the desire to grow plants. Satisfactions are in the nature of the case.

Some Annuals in California

LESTER ROWNTREE

The method of gardening (if such it can be called) which I must fit into my manner of life, as well as the soil and exposure, limit the class of plants that grow for me. These plants must be sturdy self reliant creatures of the soil, capable of standing on their own feet for they can rely on me for few of the attentions which most flowers have been led to expect from their growers. In the spring they receive chance weedings, during the summer's drought some, but never enough, water is vouchsafed them, and transplanting and juggling of individuals goes on as I can snatch the time. It takes a rugged constitution to weather the gravelly soil, the winter storms, the summer drought and fog; and because of the demands on their resourcefulness, few of the many plants which have been called, have remained to see it through. Without this trial and error course it would have been impossible to find out which perennials could stand up under such taxing conditions and which annuals could carry on as stop gaps.

But the number of faithfuls outlasting thirteen years of neglect is surprisingly large and the list would be still greater if I had had time to ease a little the lives of the members of this enduring group of growing things. I rely a good deal on flowering shrubs and perennials but mostly upon bulbs and "hardy" annuals. I never know just what term "hardy annual" means in a state where frozen ground is known only to a relatively small group of gardeners, but what I mean here is that my annuals are the boys taking serious neglect and in spite of it staying with me by means of self perpetuation.

My most weed-like annuals are not always the best loved. There is *Bidens grandiflora* (*B. serrulata*), seed of which I brought from Mexico and scattered along with those of other less persistent plants, from points far south. Sometimes I'm sorry I ever included this eighteen-inch king of selfsows but when, toward the end of summer (a time when plant life in California drags along doing its best to tide over until the coming of rains), old bidens, almost a year-round bloomer, continues to cheer with its flat five-pointed yellow stars, my drastic yanking out of seedlings reaches neap tide.

With a linum which came to me under the name of *L. campanulatum* I am much more tender hearted quelling it only when its tall straight stems get into paths or rise abruptly from flat mats of groundcovers. I love the soft yellow of its feathery bloom especially when it floats over a tiny maquis-chaparral sort of effect below the house where the dull pinks and deep creams of low brooms are conspicuous, or its mistineau waves above blue or white *Geranium pratense* or gives grace to clunky lavender *Erigeron glaucus*.

A hybrid marked, *Linaria alpina* from an English source is an ardent free flopper whose prettiness must be discouraged for it is a stronger and more insistent adventive than the type which is perennial and much smaller. This linaria looks to me like *L. tristis*, an annual. It has a wider range of color and many pleasant combinations; there are browns and pale yellows, tans and strong yellows, shades of purple-lilac and lavender in with its deep cream or yellow tones. This volunteer



Bidens grandiflora

keeps cropping up in the vegetable garden, a good place for the rogueing of the unwanted in order to segregate colors I prefer.

I let many *Chrysanthemum mawii* seedlings remain in the vegetable garden, for this annual, which here behaves, when permitted as a perennial, has been a pet of mine ever since twenty years ago when it was quite unknown to the trade, it came to me from Africa. My only grievance against this feathery leaved free-lance is that here, in the richness and moisture the pampered kitchen garden occupants demand, *Chrysanthemum mawii* selfsows are less gray and look so much like seedlings and the young of the ever appearing indigenous *Artemisia californica* that I sometimes pull them out by mistake. Now, just as in Biblical times, seed falls on fallow as well as on fertile soil and it is sad, upon going from the vegetable garden at the back of the house, to the flowers outside my study,

to look down on *Chrysanthemum mawii* half the size of those I have just left. But there is something very delightful about these low silvery-gray little plants smothered in dark-centered flowers of soft orchid though I would feel better about it if I hadn't just seen how these North Africans enjoy the flesh-spots provided for the vegetables.

Another chance resident in my beds of food is the native wind poppy. Not a common wild flower but one that is so much loved that it may have its way among the lettuce and strawberry plants. There the slender eighteen-inch stems of *Papaver heterophyllum* with their poppy foliage of delicate green hold nodding buds and deep apricot (almost buff) flowers each centered with maroon blotches ringed with bright orange-scarlet.

The Diamond flower, *Ionopsidium acaule* from Portugal makes a splendid gap filler between very low plants and is invaluable as a groundcover for small



Papaver heretophyllum

bulbs. It should not be crowded but it should be allowed to brighten the ground freely with its small four-petaled flowers of light violet-blue.

Many Africans take to my unpromising hillside. *Arcotis*, *Dimorphotheca* and *Felicia* species perpetuate their kind giving me interestingly colored hybrids and thriving so well on neglect that I am quite content not to dwell on the voluptuousness that might be theirs with proper garden attention. *Dimorphotheca annua* is low and starch white and *Felicia aethiopica* is one of my prize standbys because of the deep pure bright blue of its bloom. Several *Felicia* species grown together may produce attractive hybrids with quite unique variations in foliage shapes, width of rays and in colors.

While I must bring myself to remove a *Felicia*, I have never been troubled by *Nierembergia caerulea* throwing itself about too freely. Many years ago this now popular annual wild flower of Argentina was sent to me from England under the name of *N. hippomanica*. Mine is the type whose frail low mounds become covered with flower-cups having gray and a little purple in their blue, but hybridists have now given us many different shades. Nor have I ever had to thrust out many seedlings of one of the nicest of wallflowers, *Erysimum insulare* from the Santa Barbara Channel Islands. In sandy soil this perennial, which may also turn out to be biennial or even annual, is an eager selfstarter and on the shores of San Miguel Rosa Islands as well as in one or two places on the mainland, the leaf tufts of this low wide plant are awake with round clusters of fragrant yellow flowers. A gopher got my last seedling and when the government allows visitors to the islands I must re-

turn to these enchanting places for a new supply of seed.

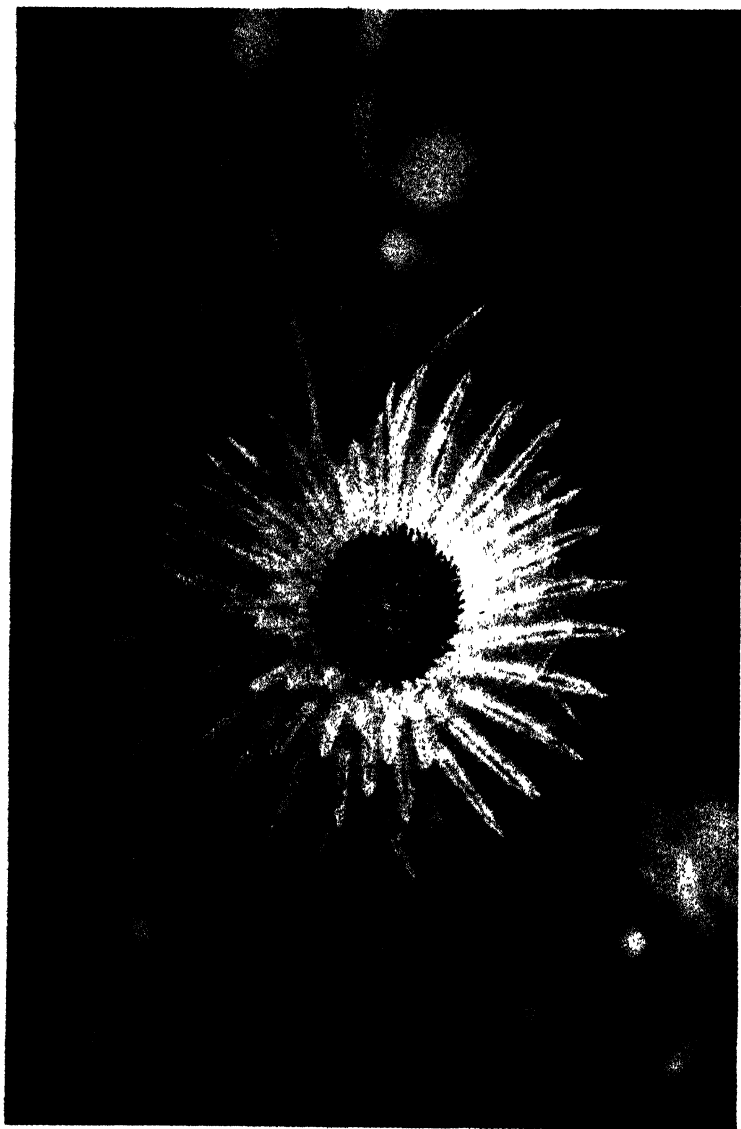
But to get back to the true street gamins of the flower garden! Six of them are local natives and while their numbers round the house are kept down by stronger plants, they are within waving distance of brothers massed higher up on the hill. The tallest and most conspicuous of these is the cobweb thistle, *Cirsium occidentale* var. *coulteri*, never, I hasten to add, a pest. It is one of the most admired plants of this region for its cyclamen-purple blooms are nested in threads of silver. There is a crystalline quality to the picture when this luminous rises above a mass of *Gilia densiflora* the heavy heads of which are carried on stiff, wiry, slender one-foot stems. The flowers are often pure white but may be soft shades of pink or lavender.

In late July this couple is joined by myriads of the orchid-colored blossoms of *Godetia bottae* which sweep across the hills in broad patches of color. If given the space one plant, a foot tall, will fill a square yard with arching stems carrying drooping buds and large bowl-shaped blossoms. *Godetia cylindrica* from southern California gives the same garden effect though its lilac-lavender flowers have centers of yellow and purple.

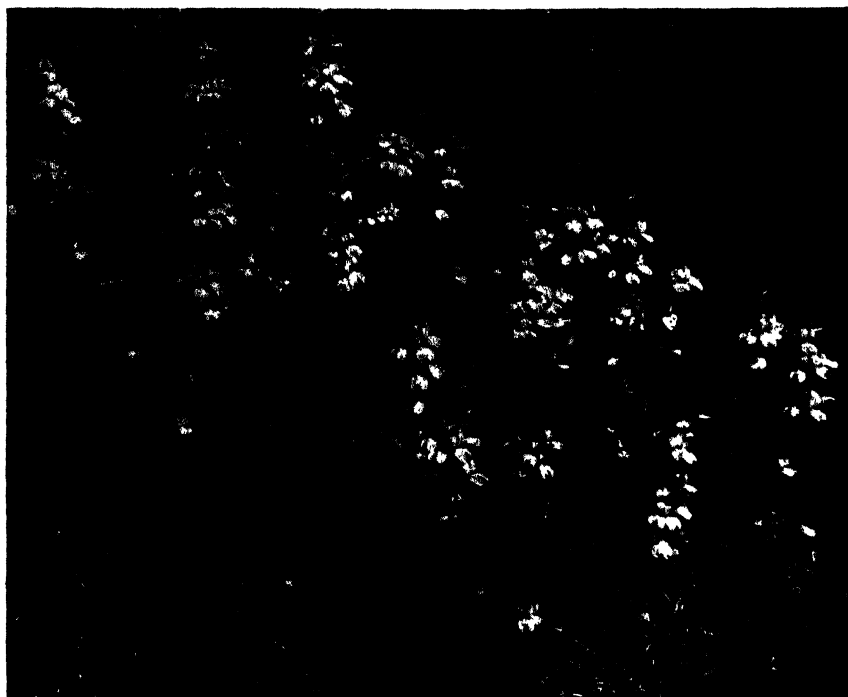
The other triplet indigenous to these hills and encouraged to mix with my exotics, needs a little shade if grown where the spring and summer sun is strong. Chinese Houses, *Collinsia bicolor*, Cream Cups, *Platystemon californicus* and Baby Blue Eyes, *Nemophila insignis* are often found growing together and make a happy garden combination. The lilac-purple, yellow and white of erect Chinese Houses rises above the two lower,



Dimorphotheca annua

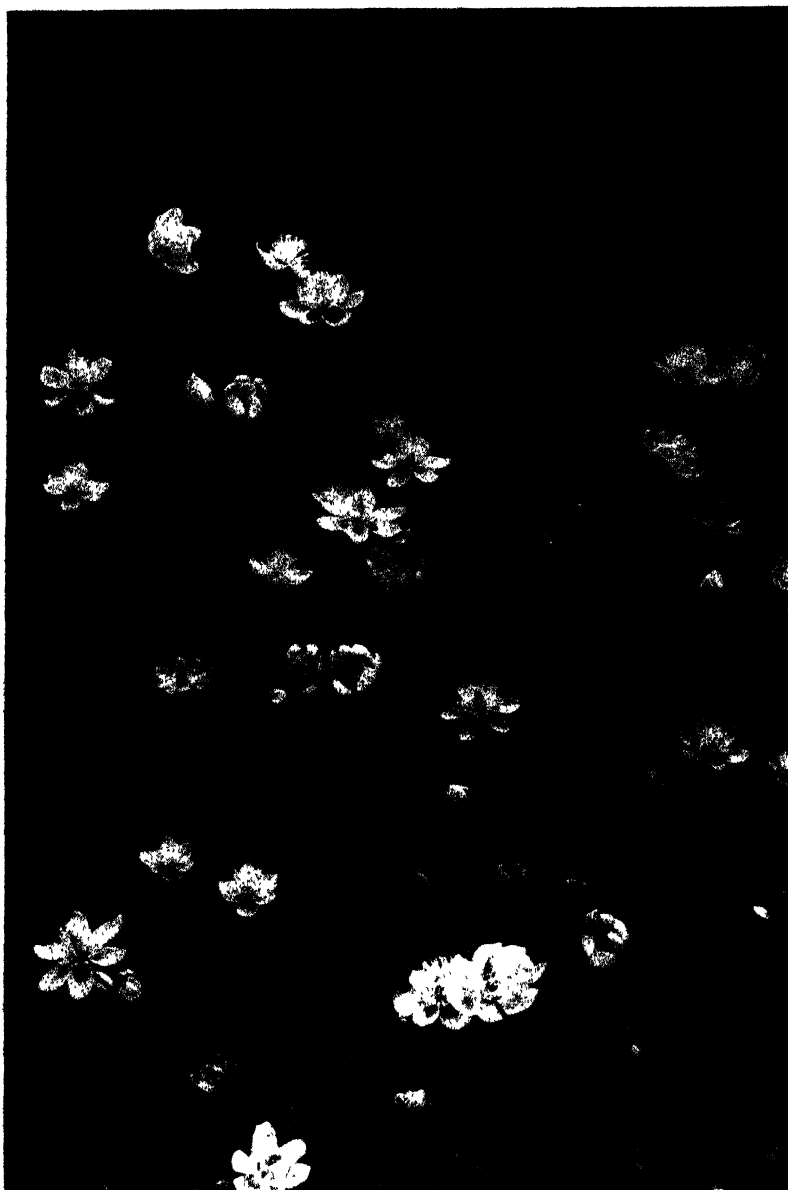


Cirsium occidentale var. *coulteri*

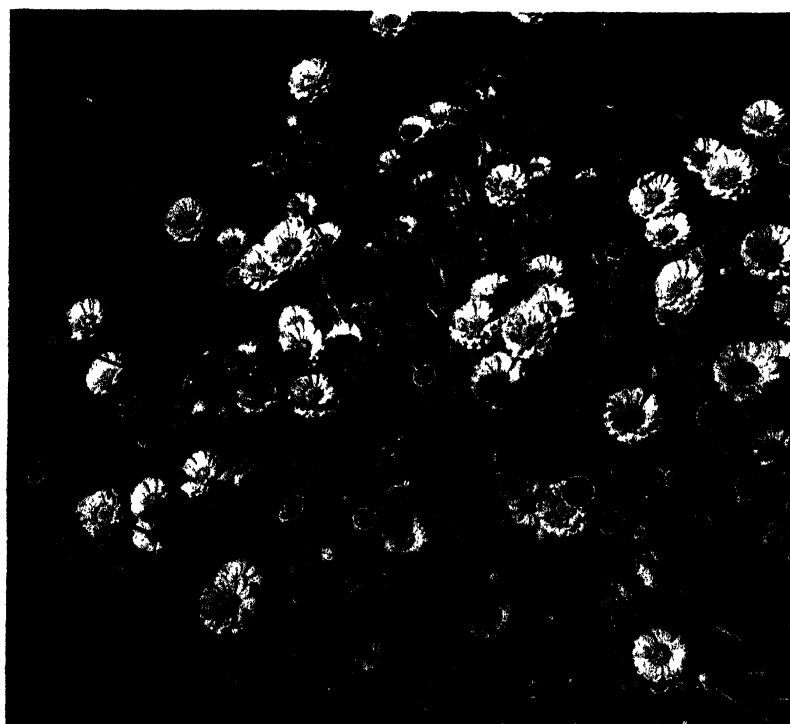
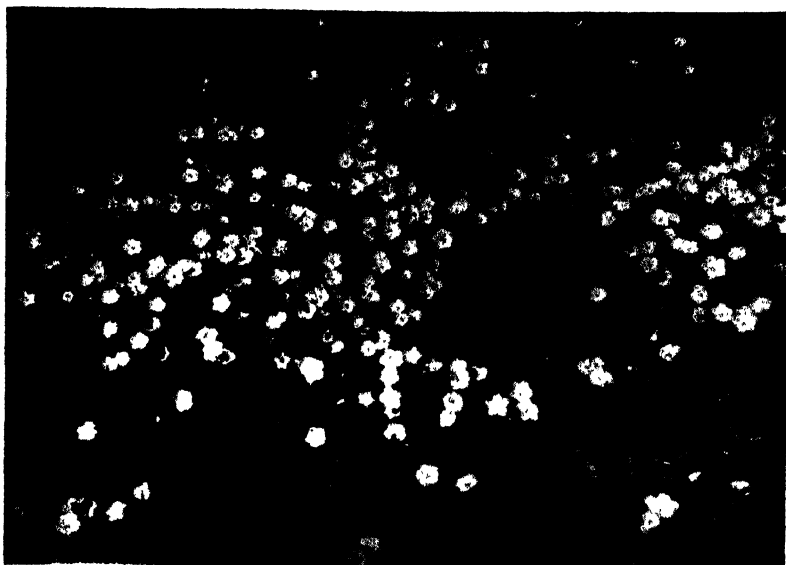


Collinsia bicolor (upper)

Gilia densiflora (lower)



Platystemon californicum



Nemophila insignis (upper)

Baileya multiradiata (lower)

spreading companions; the engaging little cream poppies are stamen-filled and have soft stems and leaves; *nemophila* adds the needed blue. Though *Nemophila insignis* is grown in almost every state, I get constant inquiries as to its culture and it might be a good thing to say here that in the East I had success and all summer bloom by sowing the seed outdoors in May and thinning when two inches tall. As a wild flower it is influenced greatly by the conditions in which it grows. In rich soil and shade it may climb over two feet into neighboring hushes and in exposure it may be a petite two inches. It comes in many shades of blue and one sometimes finds an albino.

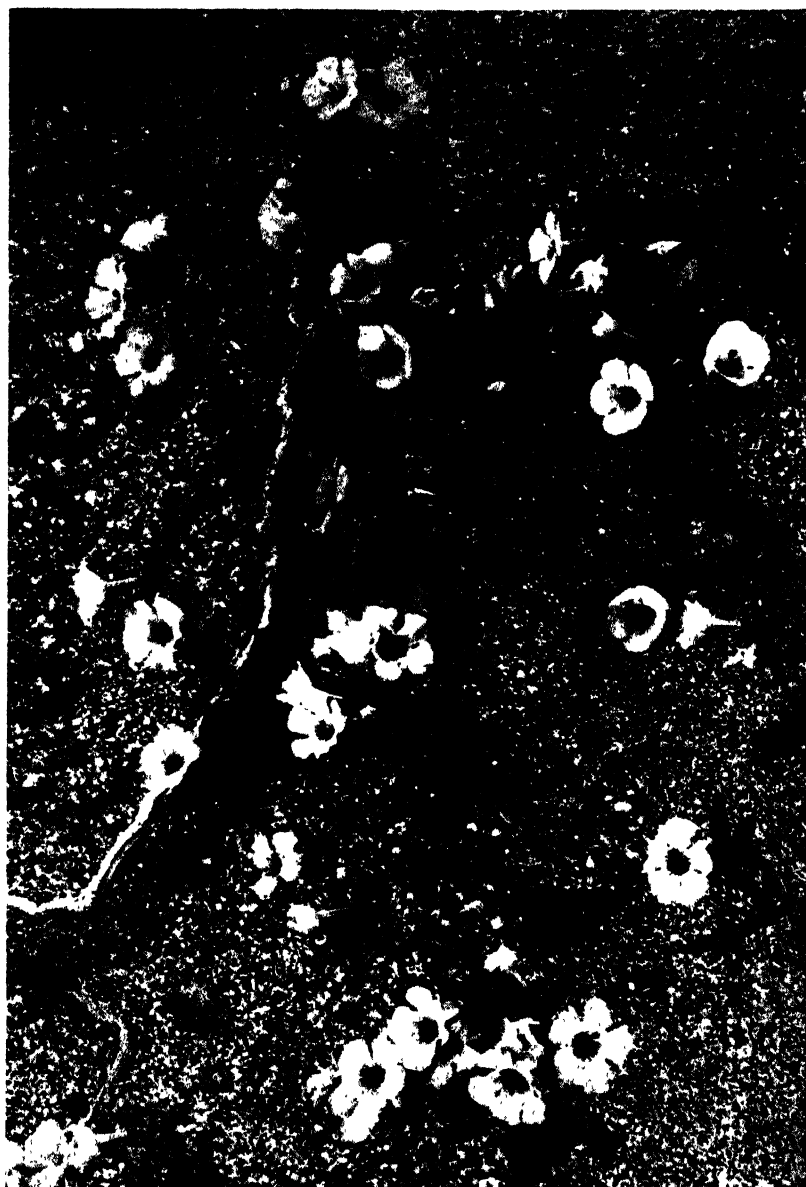
I had meant, in these notes, to lay off California annuals for the attributes of this state are flaunted blatantly and without cessation. But some annual wild flowers keep getting in my way and I must add a few others that help to keep the ball rolling through the year. *Coreopsis maritima* is indispensable to my garden. All winter and well into summer it provides huge glistening yellow daisies for cutting. The white form of *Clarkia pulchella* is a charmer and so are the many color forms of dwarf *Linanthus androsaccus* especially when their pinks, oranges and pastel shades bloom beneath the blue Chinese delphiniums. *Lupinus densiflorus* in different colors is a grand standby and, for hot places where the soil is light, eighteen-inch golden *Baileya multiradiata* and tiny deep crimson *Mimulus bigelovii* are tops. And I could never get along without my flat pads of seaside *eschscholtzia*, *E. maritima*, with its silvery foliage and lemon-yellow flowers, orange-blotched in the center.

This haphazard way of using annuals is a far cry from growing them

as bedding plants though many species may be used by both schools of gardening. If the plant is to be expected to be on its own it should never be transplanted from the flat but the seed should be sown in the place where it is to operate. There it will come up when it feels the urge which is not always the time we expect. If any hoeing is done it should be when the seedlings are very small for even at that stage the roots are long, having already started out on their journey for moisture and food.

Cultivation has no place in the life of the audacious annual for this would disturb the plants or bulbs next door. Mother Earth and the elements have more to do with shaping the course of these unconstrained ones than the gardener has and it is interesting to notice results. A planting of bedding annuals can usually be depended upon to perform at a certain time. Not so the untamed. Surprises are always happening. Some years the time and amount of rain pleases one set of plants and disgruntles others just as it does the wild flowers of this climatically crazy state. There are banner years for the Africans and others when white *Omphalodes linifolia* and anagallis in various colors, Europeans both, are knockouts and I remember one year when all the species campanulas bourgeoned forth in unrestrained glee.

Gardening with this high handed group has its drawbacks. It doesn't make for tidiness for there is little huffing and puffing over dropped leaves and seed pods must of necessity, stand until they have spilled their loads. There is no evidence of manicuring and there are few straight lines; one just picks one's way across closely covered ground as through a mountain meadow or a flowery coastal sward.



Mimulus bigelovii

But pleasant unexpected pictures appear; a blue anagallis nestles close to a dwarf lavender in the crevice of a step; a lilac *Iberis gibraltarica* sprawls at the edge of a colony of shell-pink selfsown candytuft.

Self sowing annuals have taught me a lot. They have demonstrated power of which I never dreamed them capable and proved their strength and endur-

ance through exigencies no bedding plant could put up with. Even though many annuals are plants of only several months there are enough interloping species to provide year-round bloom. They leave no room for weeds for they themselves are the weeds. I'm all for 'em.

Carmel, California.

The Royal Horticultural Society

COLONEL R. F. DURHAM, Secretary

The early years of the nineteenth century saw a great horticultural renaissance stimulated to a large extent by the introduction of new plants, plants such as the Chrysanthemums, the Camellia and Wistaria. Thus it was that on 7th March, 1804, the Horticultural Society of London was founded by an enthusiastic small body of men, under the leadership of John Wedgewood.

Its first meeting took place at Messrs. Hatchard's bookshop in Piccadilly, London. The purpose of the Society was then defined (and this definition has not been altered) in the following words: "To collect every information respecting the culture and treatment of all plants and trees as well culinary as ornamental—to foster and encourage every branch of horticulture and all the arts connected with it." A Royal Charter was granted on April 7, 1809, and since then the Society has been known as the Royal Horticultural Society. Supplementary Charters have been granted—the last one being on July 9, 1928. It may with pride be claimed that it is the largest, and perhaps the most influential of all horticultural societies.

Its first President was the Earl of Dartmouth, and up to date in its long life of now over 140 years there have been but twelve Presidents, the present holder of the post being Lord Aberconway, whose garden at Bodnant, North Wales, is world-famed. From the small beginning of seven enthusiasts, the Society now numbers over 25,000 Fellows, although prior to the war this figure was much larger.

In order to carry out the principles laid down at its foundation, one of its

first undertakings was the establishment in 1818 of a garden in Kensington, London, for the purpose of raising seeds and plants received from abroad from correspondents and collectors, who were sent out or were subsidized by the Society to North America, China and Japan. James Douglas introduced many firs and pines from North America, whilst Parks and Reeves sent over the first Chrysanthemums, Camellias, Peonies, etc., from China, and this list can be extended including many other famous names. Coming to more recent days, the Society has obtained valuable new plants from such explorers as George Forrest and Kingdon Ward from Upper Burma and the Himalayas and the border lands of Tibet.

Special mention, however, should be made on this occasion of Indian collectors who have been honored by the Society with the gold Lindley medal—Major Lal Dhwoj, of Nepal, for his plant collecting, and he arranged for the dispatch of plants of *Primula sonchifolia*, which were successfully flowered after arrival; Professor Radamand Sharma, of Katamandu of Nepal, and Lala Anim Chand, Deputy Conservator of the forest of Bara Mula in Kashmir. It is from such men and from such sources that the gardens of Great Britain have been enriched with masses of beautiful flowers, Rhododendrons, Lilies, Primulas and Gentians—all too numerous to mention singly.

To return again to the activities of the Society in other aspects. On the occasion of the Society's centenary, in 1904, the Society acquired an Exhibition Hall, a Library and offices, built partly with moneys supplied by gen-

erous donors and partly out of its own funds. On this occasion, too, the Society acquired a new garden through the generosity of Mr. Hanbury, who donated the present gardens at Wisley, Ripley, in the County of Surrey.

Here at this garden there are many activities, besides its being the home of collections of good garden plants (for plants that withstand the climate of Wisley may be considered hardy in most parts of Great Britain, the colder districts excepted.) It is here that trials of new plants, garden plants, florists' flowers (such as Dahlias, Delphiniums, Carnations, etc.) are carried out, and adjudicated on. These new plants have already been selected by special committees from exhibits submitted to the Society at its Shows. Fruit and vegetables are treated in the same manner. In pre-war days, however, every year a program of invited trials was carried out and this practice will undoubtedly be revived in due course, but during the war the chief trials have been of vegetable seeds sent to this country from America and other parts of the world under the Lease-Lend Act. The seeds are tested for quality and purity of strain in order to guide the Government in its future purchases.

The gardens themselves are divided more or less into distinct groups. The Alpines are accommodated in a large rock garden, Alpine meadow and Alpine house, the aquatics in ponds and the borders thereof, there is a garden for roses, borders for herbaceous and annual plants, a wild section full of Rhododendrons and azaleas, where lilies grow well in the undergrowth, as well as the trial grounds for the various flowers, fruit and vegetables. In the gardens there is an administrative building and a laboratory, where a staff of scientists are employed in the first place to give advice on cultural matters to the Fellows of the Society, and then

to carry out research work on special problems concerning horticulture generally, more especially, however, on garden plants. It is, however, from the head office in London, in Vincent Square, that the main administration of the Society is directed, and here at the offices are found the Library and the Exhibition Halls (a second Hall of larger dimensions than the Hall of 1904 having been built in 1927, as the accommodation had proved insufficient for the growth of the Society, the size of its exhibits and the number of its exhibitors.)

The Library is called the Lindley Library, the nucleus of which belonged to Lindley, the botanist. It was acquired by the Society, and is certainly the most comprehensive horticultural library in Europe, and is constantly being enriched by bequests and gifts, besides purchases in the ordinary way. It is open for consultation by the Fellows, who have the privilege of borrowing books under certain conditions, and it contains about 20,000 volumes and pamphlets.

The Exhibition Halls, or at least one of them, are used for the purpose of its Shows, which under normal conditions are held fortnightly throughout the year. It is a source of great satisfaction to be able to say that, with a few gaps, they have during the war period been held more or less monthly. Perhaps the most important Show, and it is hoped that this will be revived next year, is the Society's great world-famed Spring Show, held usually in the last week of May at the Royal Hospital, Chelsea. At these Shows the Society's Committees, formed to deal with all kinds of plants, sit and adjudicate on the exhibits placed before them and awards such as "First-class Certificate," "Award of Merit," "Highly Commended," "Certificate of Preliminary Commendation" and "Selection

for Trial" at the gardens at Wisley are made. For the exhibits themselves medals in various grades, gold, silver-gilt, silver and bronze, are given, for plants, fruit and vegetables. A special medal, the gold Lindley Medal is also awarded for the introduction of new species or for plants of high botanical interest.

It will be of interest to mention that on the occasion of King George V's Jubilee, at the Chelsea Show in 1935, a tent was specially set apart for exhibits of plants representative of the Indian Empire, the Dominions and the Colonies, and on this occasion not less than over one hundred species of plants from India and Burma were specially staged, drawn partly from India, and partly from collections in this country.

Another of the Society's activities which must not be overlooked is its educational side, and its conduct of examinations in the home country. Junior, Senior, Teachers' and the National Diploma in Horticulture examinations are held. It is to be regretted that, owing to the necessity of holding practical examinations only residents in Great Britain can take advantage of these diplomas.

To the Society are affiliated the specialist societies, such as the National Rose, the British Carnation, the National Crysanthemum societies, etc., and in addition over 600 local horticultural societies throughout the country at home, and abroad. As representative of India there is the large Agricultural and Horticultural Society of India, Calcutta, of which Mr. Percy Lancaster is the Secretary, and with whom the Society is in constant correspondence.

Further, the Society publishes important works on horticulture. It owns the Curtis's Botanical Magazine, which was founded in 1787 and is the oldest illustrated colored magazine in the world. It issues a journal regularly every month, and from time to time prepares monographs and studies on various genres of plants. It was responsible for the large and important Index Londinensis, which is an index of the illustrations of plant life which has appeared throughout the more important botanical and horticultural literature. During the war it has published numerous useful pamphlets with regard to the production of food.

(By special arrangement with the British Broadcasting Corporation.)

Breeding Potatoes Resistant to Disease

F. J. STEVENSON

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When the Spaniards invaded South America they found a large number of species and varieties of potatoes under cultivation, the tubers of which were used as a common article of food by the natives. The origin of these potatoes is shrouded in mystery, but they seem to be native to the American Continent, since their relatives are still to be found growing wild in the elevated regions extending from the southwestern part of the United States to the southern part of South America, particularly at the higher altitudes in Bolivia and Peru and in the coastal regions and nearby islands of southern Chile. All the species seem to require a cool climate, as they are found growing at high altitudes in regions near the Equator, and none is known to occur under tropical conditions.

It is interesting to note that despite the many expeditions that have gone gone into South America in search of potato varieties no wild potato has been found similar in every respect to the cultivated varieties. This might indicate that the natives had practiced potato breeding and culture perhaps centuries before the Spanish invasion. As a matter of fact, stores of dried potatoes (chuño) have been discovered in ancient tombs and ruined cities of Peru, showing that potatoes were probably a staple article of diet several centuries before the coming of the Spaniards. Furthermore, funeral urns closely modeled after potato tubers and resembling those produced by breeding and culture and not the wild forms

have been found in prehistoric Peruvian graves.

Just as the origin of the cultivated potato is not well known, so its introduction into Europe and North America is veiled in the obscurity of legendary stories. It probably was carried to Spain from Peru early in the sixteenth century. Many early introductions by explorers and travelers may have occurred. The large number of varieties that have been grown lends credence to this statement, because it is improbable that such a wide range of characters would result from breeding with only one or two introductions as original parents.

Regarding the introduction of the potato into Great Britain the two stories that have been believed to the greatest extent are the legends surrounding Raleigh and Drake (2). The first one states that "*Solanum tuberosum*, the common potato of our fields and gardens, was first introduced by Sir Walter Raleigh who brought the roots from Quito and caused them to be planted in his own garden at Youghal, Ireland." According to the Drake legend, "The famous English admiral Francis Drake deserves the credit for the introduction of the potato into Europe. On his return from Virginia in 1586, he brought thence the potato with him. Wishing to domesticate it in England, he not only gave some of the tubers to John Gerard but also handed a part of them to his own gardener telling him to plant the precious fruit in his garden".

From this point on the two stories are parallel. The plants were grown in the respective gardens and bore fruit. The gardeners, thinking the fruits, or potato apples, were the edible portions of the plants, tasted them and found them quite unpalatable. Each gardener confronted his master with the worthlessness of the new plants, and each was advised to dig them up at once, when to their surprise they found that the valuable parts had developed underground. Both legends are false.

Little is known of the introduction of the potato to North America. It is generally believed that the English colonists of Virginia and Carolina obtained it from Spaniards or from other travelers. However true that may be, potato growing in this country seems to have got its best start in 1719 from stock brought from Ireland and grown at Londonderry, N. H. Most of the stories of the introduction into Europe and North America may be legends, but the spectacular increase of the potato as a food crop is not legendary; it is one of the miracles of agriculture. It is probably less than 400 years since the potato was first introduced into Europe and about 225 years since it was brought from Ireland to be grown by the colonists in New Hampshire, and yet it is now one of the leading food crops of the world. The crop for the United States and Canada approaches a half-billion bushels, and the 5-year average (1935-1939) for the world crop was over 8 billion bushels.

Despite these results growers are not satisfied with the varieties they are trying to produce. They are too susceptible to the various potato diseases that are prevalent in potato-growing regions. Consequently, the search for new and better varieties has continued. Expeditions have gone into South America from time to time.

Three of the more recent of these were sponsored by the governments of the United States, Russia, and Great Britain. None of these succeeded in bringing back varieties that will compete with the established ones, but the new importations add to the wealth of material available for plant breeding work.

EARLY IMPROVEMENT OF THE POTATO

There is little information available regarding the source of the potato stock grown during the first 100 years after its introduction into the United States. It is believed that not many new varieties of importance were produced during that period. During the second century of potato culture in this country, however, there was great activity in the production of new varieties. Data reported on 228 of these varieties show that they originated in 21 states. New York and Vermont produced about 50 per cent of the total number. Of the 160 varieties whose date of origin is known 80 per cent were produced during the 40-year period, 1861 to 1900, and 48 per cent during the two decades, 1871 to 1890 (1).

Most of the men engaged in the early work were practical potato growers; exceptions were Rev. C. E. Goodrich, a clergyman of Utica, N. Y., and E. S. Carmen, editor of the *Rural New Yorker*. The work of Goodrich during the last half of the nineteenth century is worthy of special mention. He believed with others that the disastrous epidemics of late blight during the years 1843 to 1847, which caused serious loss to potato producers in this country and a famine in Ireland, were the result of a reduction in the vigor of the plants caused by long-continued propagation by vegetative means. He believed also that this vigor could be restored by growing plants from true seed. While he did

not succeed in the control of late blight by this means, he may be considered to have laid the foundation of potato breeding in this country by furnishing material to be used by other breeders.

The ancestry of 217 varieties of American origin can be traced back to Goodrich's *Garnet Chili*, a seedling of the Rough Purple Chili. They include several of the well-known varieties of commerce, such as, Green Mountain, Early Rose, Early Ohio, Beauty of Hebron, Prolific, and Triumph (3).

Some of these varieties, such as Green Mountain and Burbank, reach a high standard of excellence in yielding ability and culinary quality when grown under conditions to which they are adapted. These same varieties, however, are poor in other characters. Some are not adapted to a wide range of conditions; others have deep-eyed tubers, which cause waste in preparing the potatoes for cooking. All are susceptible to all or nearly all of the common diseases of potatoes, including virus diseases, late blight, early blight, common scab, fusarium wilt, rhizoctonia, blackleg, southern bacterial wilt, and ring rot. Control of these diseases requires a continual fight on the part of the growers and adds not only to the drudgery but to the cost of potato growing.

As a group, diseases caused by viruses are perhaps the most widespread and the most baffling. In this group are found mild mosaic, latent mosaic, rugose mosaic, spindle tuber, yellow dwarf, and leaf roll, with its accompanying net necrosis of the tubers of some varieties, notably the Green Mountain. The virus diseases occur in every potato-growing region of the United States, and it is probable that not a single field could be found entirely free from one or more of them. They are not new. Their effects have

been observed by growers for many years, but for a long time it was thought that they were due to "running out" or "degeneracy" brought about by growing potatoes year after year from the same tuber stock. It is relatively only a short time since it was discovered that these troubles are due to virus infection. It was early observed that some varieties did not run out so quickly as others or, as we now say, some varieties are more resistant to the attacks of certain viruses than others. Knowing that such differences must have a genetic basis, breeders in recent years have been working to obtain resistance to these diseases in combination with other characters of economic importance. In a number of cases they have achieved notable success as will be shown later in this paper.

Late blight, caused by *Phytophthora infestans* (Mont.) D By., adds more to the cost of producing the potato crop than perhaps any of the other diseases. In spite of the great cost of spraying and dusting to protect the crop large losses are sustained by the growers. In some seasons and in certain localities, the disease causes very little damage, but all too frequently the losses run into millions of bushels. Epiphytotics occurred in 1927, 1928, 1932, 1936, 1938, and 1943. According to the reports of the Division of Mycology and Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture, the heaviest loss from late blight (31 million bushels) occurred in 1928. That year blight was reported in 15 States, with the loss in New York estimated at approximately 13 million bushels. In 1932 the reduction of the crop was estimated at 9,230,000 bushels the greater part of which (9,058,000 bushels) was reported from Maine.

Again in 1936, 1938, and 1943, large losses occurred in Maine.

It is true that late blight can be controlled to a large extent by careful spraying with Bordeaux mixture, but despite the facts that control measures are being practiced more generally than ever, that spray equipment has been improved, and that spray programs have been more faithfully carried out large losses continue to occur, not only from reductions in yield but also from tuber rots initiated by the late blight fungus. These rots may develop on infected tubers in storage and in transit. Because of the uncertainty involved in blight years buyers are reluctant to purchase potatoes for storage purposes. Considerable expense is involved every time a carload of potatoes has to be regraded at a terminal market, and this happens all too frequently in bad blight years. These losses all affect the growers adversely.

Common scab, caused by *Actinomyces scabies* (Thaxter) Gus sow, is another disease that causes losses in every section where potatoes are grown, and its attacks have become so severe in places that potatoes can no longer be produced profitably. The organisms causing this disease live over in the soil and are also carried on the tubers. Soil treatments have been tried, but they are costly and are not reliable. Treatments have been recommended that will kill the organisms on the seed potatoes, but no method has yet been devised that will protect fully the growing tubers from the soil-borne organisms.

A bacterial disease, ring rot, has recently come into prominence as a widespread menace to potato production. Sanitary measures and the insistence by state authorities that no seed be certified that has even a trace of ring rot in it have done much

to keep this disease under control. However, outbreaks are frequent in spite of all precautions, and heavy losses occur.

Millions of dollars are spent each year in providing ways and means of protecting the crop from the attacks of these and other diseases, but until recently comparatively little attention had been given to obtaining varieties that are resistant to their attacks. Results obtained indicate that by using genetic principles as a working tool it is possible to solve many of these problems by producing new varieties in which resistance to various diseases is combined with other characters of economic importance, such as shallowness of eye, desirable shape, good cooking quality, and high yield.

To understand the production of new varieties of potatoes it is necessary to know something about their reproduction. Potato plants are propagated in two ways: asexually and sexually. In commercial practice the new crop is grown from seed tubers, a method of vegetative or asexual reproduction. In most of the potato-breeding work plants are grown from the true seed produced in the fruits of the potato plant in about the same way that tomato plants are grown. Some varieties of potatoes, such as Katahdin, when grown in the North and cooler climates of the country frequently produce fruits or potato balls.

The same variety can be propagated vegetatively for years without change, so that selection within it is usually fertile. Occasionally bud mutations do occur, and a few new potato varieties have been obtained by that method, but such changes are too few and far between to be relied upon as the only source of variation in a breeding program. In a high percentage of the cases, too, the changes are of minor importance. Most of those observed

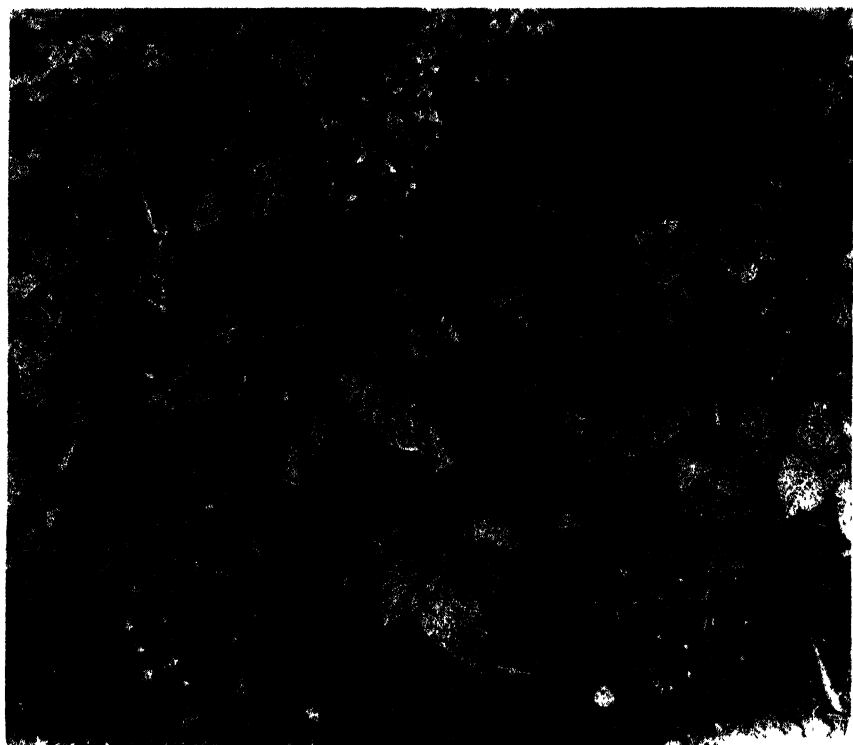


Figure 1. Potato plants showing clusters of fruits or seed balls. Some varieties in northern cool, long-day climates produce seed balls abundantly.

have been in the color of the skin. There are a number of instances where the red tuber loses part of its color and becomes "splashed", or all of its red color and becomes white. Purple tubers may become red, purple splash, or white. Other examples are a red-tubered sport from a white-tubered variety, or a fully colored variety from a partially colored one. Mutations involving more than one character in the same individual are extremely rare. That the occurrence of such mutations has not been an important factor in the development of potato varieties was shown by Clark (1), who reported that of 380 varieties that originated in the United States and have at one time or another been introduced in commercial

trade 93.3 per cent were of seedling origin and only 22, or 6.7 per cent were reported as so-called sports or mutants. Of the 22 varieties reported as sports, 4 are white-tubered from varieties with colored tubers and 4 are late-maturing variations found in early varieties. The meager information regarding the other 14 furnishes no basis for determining whether they were actual mutations, or admixtures carried in the seed stock, or volunteers that had persisted in the soil from some preceding crop. Even though only a few varieties have arisen as the result of somatic mutation, this is still a source of variation that cannot be ignored entirely by the plant breeder. On the other hand, since it is quite



Figure 2. One corner of the greenhouse of the Plant Industry Station, at Beltsville, Md., showing potatoes in full bloom and a technician pollinating the flowers

impractical to make much improvement by selecting tubers of a variety with the hope of getting something new, the plant breeder must resort to the use of seed and seedlings to get a very wide range of variation.

Many people who live in the South or where the climate is hot and dry have never seen a seed ball on a potato plant, and not a few are quite surprised when they first discover one. On the other hand, in northern cool, long-day climates some varieties of potatoes produce seed balls in abundance (Figure 1).

The seeds are the product of sexual reproduction and are found in the fruit which is quite similar to a small tomato. Each fruit may contain 200 seeds or more, and these seeds will produce plants that are quite different from each other. Most of these seedlings are undesirable from the com-

mmercial standpoint, but occasionally one is produced that is an improvement over the old varieties.

The potato is classified as a self-fertile plant, but there is much variation among seedlings and varieties in this respect. Under conditions of relatively low temperature and high light intensity, such as are usually found in summer in northeastern Maine, in the Great Lakes districts of Michigan, Wisconsin, and Minnesota, and at high altitudes, as at Estes Park, Colo., some varieties will produce seed quite freely from self-pollination; others will bloom profusely, and although they do not produce viable pollen they can be hand-pollinated and made to produce fruit. Other varieties are more perverse. Their flowers will open, persist for a few days, and drop. On still others the flower buds drop before they open.

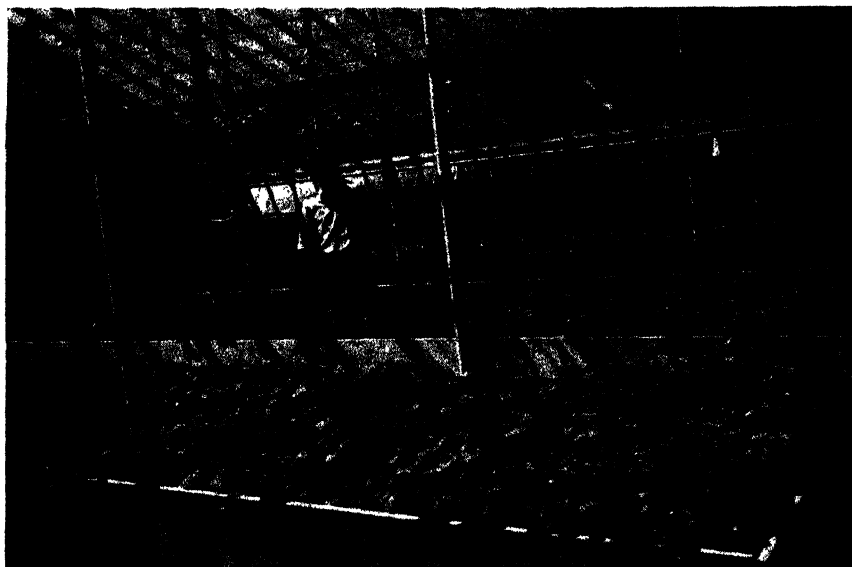


Figure 3. Growing potato seedlings in 3-inch pots in the greenhouse.

Until recently sterility was one of the greatest handicaps of the potato breeder, but by selecting for fertility this stumbling block has been largely overcome. The environment problem has also been partially solved. We have learned to simulate in the greenhouse the summer resort conditions of the Northern States. At Beltsville, Md., this is done during the winter when the temperatures can be controlled. The long day is compensated for by the use of artificial lights to give the plants the equivalent of 17 to 18 hours of light. Under such conditions many varieties bloom *freely* (Figure 2). With a relatively large number of pollinators and a suitable environment we have been able to produce large quantities of seed.

The seedlings are grown to maturity in 3-inch pots in the greenhouse (Figure 3) during the winter and fall and the small tubers produced are distributed the following spring to various State experiment stations where they

are increased and tested to determine their value as potential varieties (Figure 4). Since problems and objectives in potato breeding often cut across State lines and involve large regions of the country, the work has been organized as a national project with about 35 State experiment stations and the United States Department of Agriculture cooperating.

The practice under this program is to send seedlings produced by the United States Department of Agriculture or by any of the cooperating State experiment stations to others States for trial. If, after sufficient tests, any seedling variety shows superiority to the standard varieties in at least one important character, such as yield, market quality, or resistance to a disease that is difficult or in some instances impossible to control, it is named and released to growers in the region to which it is adapted. As a result of this work, about 20 new varieties have been distributed during

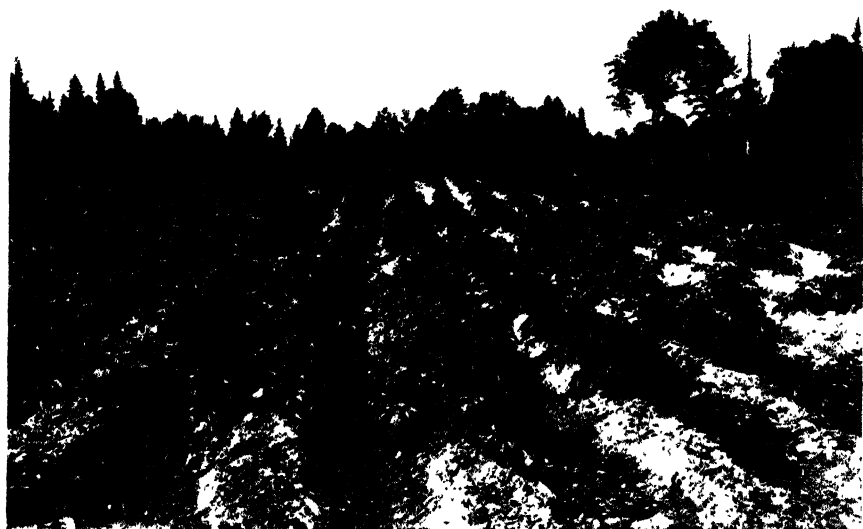


Figure 4. A view of potato seedlings grown for increase and various tests at Arrostook Farm, Presque Isle, Maine.

the 12-year period just past. A number of these have increased very rapidly in yearly production; others have increased rather slowly; and a few have already fallen by the wayside. Last year about 30 per cent of all the certified seed potatoes produced consisted of these new varieties.

No variety has been distributed that will meet the needs of the growers in all the cooperating States, and it is doubtful if such an ideal variety will be produced in the near future. There was, however, a sectional demand for each one of the new varieties, and they have been increased against hard competition and very critical evaluation, because of special characters that give them a definite advantage over the old varieties. The Katahdin, the first to be put out, got its start in Michigan when it was found that under unfavorable growing conditions in the

latter part of the growing season it would outyield Rurals. The Chippewa, because it was somewhat earlier than the Katahdin, became a competitor in Michigan and spread to Wisconsin and Minnesota. Maine was interested at first in these two varieties only from the standpoint of seed tuber production for other States; but as a result of severe epidemics of net necrosis in the Green Mountain variety in 1938 to 1942, inclusive, and again in 1944, the acreage of these two new varieties for table stock production has increased very rapidly because neither of them develops net necrosis in its tubers. Extensive efforts are now being made to keep the Green Mountain from going out of production, but even if it does regain its former position as the most extensively grown late variety in Maine, it should be remembered that for at least 7 years the

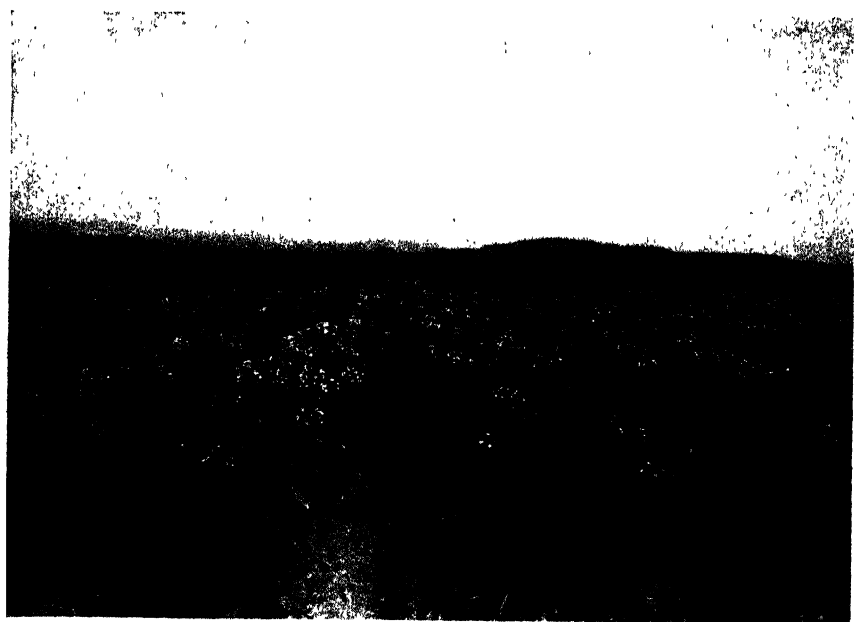


Figure 5. A field of Sebago showing the upright vigorous vines.

new varieties saved the industry in relatively large portions of the potato producing sections of that State.

Sebago, another new variety, has made a phenomenal record. From less than 10 acres harvested in 1938 it multiplied until in 1944 approximately 1,800,000 bushels of seed of this variety were certified. It has, however, spread to certain sections where it is not well adapted, and it would not be surprising to see it decrease somewhat in production. Sebago was released not because it was perfect but because it had the best combination of characters available at the time. Its vines are upright (Figure 5) and more resistant to late blight than those of the commonly grown commercial varieties, although not nearly so resistant as some of the seedling varieties under test at present. It produces, when properly grown, high yields of smooth, shallow-eyed tubers (Figure 6). The

tubers are resistant to rots initiated by the late blight fungus, one of the most important characters, and it is more resistant to common scab than Irish Cobbler or Green Mountain. Sebago is immune to mild mosaic in the field, and trials in New York and Wisconsin have shown it to be resistant to yellow dwarf. It is grown almost exclusively in the Hastings district of Florida because of its high yields of marketable potatoes, its late blight resistance, and its resistance to brown rot, a bacterial disease also referred to as Southern bacterial wilt. The Sebago shows resistance to more diseases than any other variety in production in the United States and furnishes a good example of what the potato breeders are striving for. It will take some time to get just the varieties of potato we are striving for, but as new varieties are produced that are superior to present commercial vari-

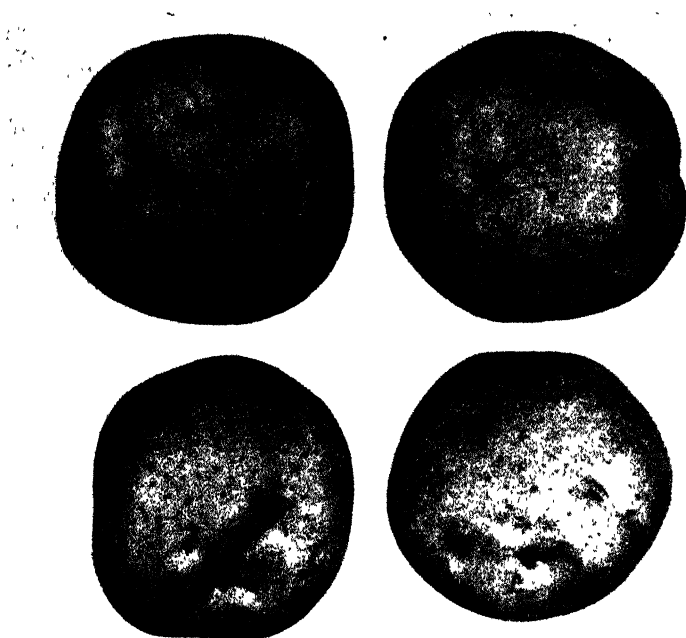


Figure 6. Tubers of Sebago showing their smooth, shallow-eyed character.

eties in at least one important character they are distributed to growers.

A list of characters that are now available to plant breeders in this country would include: Wide adaptation; variation in time of maturity from very early to very late, desirable shape of tubers with the tendency to hold that shape under a wide range of environmental conditions, shallow eyes, making it easier for the grower to brush or wash the tubers before marketing them and resulting in less waste in preparing them for cooking; high yielding ability; and correlated with dryness of flesh, a quality preferred by many consumers in the United States. In addition, we have varieties that are highly resistant to one or several of the following diseases and insects: Mild mosaic, latent mosaic, rugose mosaic, net necrosis in the tubers caused by current-season infection

with the leaf roll virus, yellow dwarf, late blight of the vines, tuber rot initiated by the fungus that causes late blight, common scab, potato wart, rot, ring rot, hopperburn, flea-beetle injury, and aphid injury. From the standpoint of the plant breeder this is a formidable list, and the list continues to grow as new varieties and species are being introduced from many foreign countries. It is possible that if enough work is done some degree of resistance to every one of the diseases and insects that attack potatoes can be found. The characters that are now available are not to be found in any one variety but are distributed among a relatively large number of varieties and seedlings. Most of them are not found in the old commercial varieties, but the majority of them should be incorporated in the varieties of the varieties of the future. Some of the

new varieties now under test show new combinations of characters, which a few years ago were thought to be improbable, if not impossible, to obtain. Some of these combine earliness and good cooking quality with a high degree of resistance to late blight in both vines and tubers; others have earliness and high market quality combined with scab resistance. One has high yield and good market and cooking quality combined with ring rot resistance. Still others that are in the preliminary stages of testing show combinations that should make them more valuable to growers and consumers than any heretofore distributed.

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New Palms in Florida

H. F. LOOMIS

U. S. Plant Introduction Garden, Coconut Grove, Fla.

Palms long have been the subject of active introduction in Florida and although many species, of economic value in their native country, have been brought in, this aspect usually has been of secondary importance, and it was for their beauty that the attempt was made to establish them here. The success of such attempts is everywhere evident and the number of exotic species that are being grown in one part of the state or another today runs into the hundreds. They are of very diverse size and form and their adaptability is so great that at least one or two species may be found in even the most unusual situations, and where growth conditions are more favorable, scores of kinds thrive.

The successful establishment of palms new to this country is of interest to private and commercial gardeners alike as increasing the possibilities for selective planting to get desired effects. Just what constitutes success may be a matter of some difference of opinion, but the bringing of a new palm from a tiny seedling, through the various perils it must undergo, to the stage where it flowers and possibly produces fruit is not without its thrill of accomplishment. Palm seeds generally are quite perishable and do not survive long unplanted, so that the introduction, from remote corners of the world, of seeds that will grow may be difficult, and repeated introductions often are required before viable seeds are obtained. Thus the production of fruits by a rare palm in this country makes introduction of its seeds unnecessary and insures its wider and more rapid distribution here.

Within the last year or two several palms never before successfully grown in Florida have flowered in the U. S. Plant Introduction Garden, Coconut Grove, Fla., and one of them has produced seed. Four are of economic importance in their native land while the others appear to have had few if any special uses. Here, with high land values and high labor costs it seems quite unlikely that any of them can be grown for their commercial products, but each has its attractive features that justify wide planting for the ornamental value alone.

Trithrinax brasiliensis Martius is a relatively small, single-trunked, fan-palm of slow growth that eventually reaches a height of about 12 feet so that it is an ideal plant for patios or for small dooryards where more rapid-growing palms would soon become too large. The dark green, flat leaves are borne on short petioles and are divided into 20 to 30 widely radiating segments that show little inclination to droop until quite old. The clasping leaf sheaths appear to be composed of coarsely interwoven fibres that are prolonged at the top of the sheath and form an outwardly projecting circlet of spines, giving the trunk a shaggy and somewhat forbidding aspect, that nevertheless, is curious and ornamental. Flowering may begin when the trunk is but few feet high, with several compound inflorescences produced simultaneously from the upper part of the crown of leaves. (Figure 1.)

When the flowers first appear they are creamy white and the entire inflorescence is thick and very compact with each branch of flowers protected by its



Figure 1. Flowers of *Trithrinax brasiliensis* on the first morning of their opening.

own creamy white sheath or spathe. At this stage and for several days thereafter, while the inflorescences remain white and are elongating, they have an unusual and striking beauty. (Figure 2.)

This palm is native in the southernmost state of Brazil and adjacent countries to the west and thus is at home outside of the tropics. Seeds were received here from the Washington Office in July, 1934, under P. I. No. 105865, having been donated by Mr. David Barry, Jr., of Los Angeles, Calif. This appears to be the first record of the palm in Florida although this and one or two other species of the genus have long been planted in California. Our

plant, which flowered in September, 1944, was received from Washington without the above P. I. number, but is believed to be from the same lot of seeds. It produced fruits which did not mature, possibly because of the severe drought that occurred as they were developing. This plant and others bearing the P. I. number have made good growth and the species should be able to grow as far north as Orlando and possibly beyond.

In Afghanistan and western India at elevations of from 2,000 to 5,000 feet is found a fan-leaved cluster palm that may reach a height of 20 feet. It is one of the few palms of the world that have branching trunks, the large



Figure 2. The same Trithrinax 24 hours later, showing the rapid growth that the inflorescences have made and the general character of the palm.

stems, 6 to 10 inches in diameter, often dividing to form two branches, but from reclining stems, near or partly submerged in the ground, suckers or offshoots also are produced. This palm has the scientific name of *Nannorrhops ritchiana* (Griffith) Wendl., and grows in dense colonies in very arid country where winter temperatures may go well below freezing. Throughout its native land the palm has many uses and several names, the most common of the latter being "Mazri" or "Mazari." All vegetative parts of the plant supply fuel; the very young leaves, young inflorescences and the flesh of the fruits are eaten; matting, baskets, hats, etc., are plaited from the leaves from which fiber also is obtained for the making of nets, fine matting and the like; and the pierced seeds have some commercial value when used in rosaries.

Apparently the first successful introduction of this species into the United States occurred when seed was received from Rawalpindi, India, in January 1935 and sent to this Garden from where seedlings were distributed in 1936 and 1937 bearing P. I. No. 107-747. Our field specimens have grown remarkably well and one of them flowered for the first time in November, 1944, but no seeds were produced.

These palms are now about 10 feet in height but, with their single and divided trunks and numerous basal suckers, are nearly twice as broad and form compact clumps. Their light silvery-green color, resulting from a thin wax-like deposit on the petioles and both leaf-surfaces, instantly commands attention. Closer inspection shows all the newer leaves emerging from a peculiar, light, fluffy mass of salmon-buff colored wool that darkens somewhat and is shredded by the wind as the leaves grow old. On the youngest leaves long fibers are loosened from

the upper folds of the pinnae and remain hanging in a snarled mass for a short while. The leaves themselves are about five feet across, composed of 20 to 30 pinnae joined together along considerably less than their basal half with their outer portions continuing in the same plane and seldom drooping, so that since the leaves project rigidly outward the whole plant has a stiff, bristly appearance not unlike a magnified sea urchin. The large inflorescence bears a general resemblance to that of our common palmetto being composed of many branches produced along a central stem. The spadix is not axillary (intrafoliar) as reported by Blatter in "Palms of British India and Ceylon" (p. 83) but arises from the tip of trunk. The large inflorescence projects well beyond the tips of the leaves and bears small white or cream colored flowers. On a trunk that is about to flower the last few leaves produced are rapidly reduced in size and length, the final leaf being very small. It is not known whether the stems will die after flowering is finished, as does the Talipot palm (*Corpha umbraculifera* L.) to which the Mazari palm is related.

This curious and attractive palm undoubtedly is quite hardy and should be tried throughout much of the range where our native palmetto grows. Against a background of dark green its color makes a startling and effective contrast.

One of the most useful and striking palms of the world is the Palmyra palm (*Borassus flabellifer* Linn.) a native of Ceylon and India, with related species of the same genus growing in Africa, Madagascar, Malaya, and several of the East Indian Islands. The native uses of the type species are almost without number and of a variety that probably exceeds the cocoanut, although ranking second to it in actual

economic value. In writing of the diverse products of the Palmyra palm a Tamil poem usually is cited wherein 801 uses are enumerated among which are many foods, including a kind of sugar highly thought of in the Orient, unfermented and alcoholic drinks, clothing, building materials, household utensils, fuel, mattings, nets, etc., and numberless other uses. As early as 2350 B.C., Palmyra palm leaves were used by scribes on which to write and from this use the modern reference to pages of a book as "leaves" is thought to have arisen.

The palms arrest attention from the time their trunks are only a few feet high, but as many thick at the base, to half-grown individuals 30 to 50 feet high with a great rounded crown of stiffly radiating fan leaves. Finally when the palms reach maximum size and have their crown of leaves reduced and flattened, groves of them might be mistaken for our own old stands of native palmetto except for their much greater height and thicker trunks which are awe-inspiring to the visitor.

Harold Mowry, in his "Native and Exotic Palms of Florida," Florida Agricultural Experiment Station Bulletin No. 228, May, 1931, reports the Palmyra palm as having been introduced in Florida but no specimens antedating 1931 are known to exist. The only specimens known to the writer bear P. I. No. 98487 and are growing here from seed gathered by the writer at Georgetown, British Guiana in Feb. 1932. They are not expected to flower for several years.

From the Gambia of West Africa seeds of a *Borassus* were introduced in 1929 under P. I. No. 81073 and a number were planted directly in one of our soil-filled "pot holes" where they germinated and since have made better growth than *Borassus* specimens elsewhere on the grounds.

Upon introduction this palm was called *B. flabellifer* but more probably it is *B. ethiopum* Martelli, commonly known as the "Black Rhun" or "Ronnier" palm, as its appearance and native home differ from those of the Palmyra palm.

Apparently the two species do not differ notably in size but *ethiopum* is said to be less graceful and to have swellings of the trunk not found in the Palmyra palm. Our largest palm is now about thirty feet high with a trunk diameter at base of 44 inches. The great palmate leaves, light silvery green, are from eight to ten feet across with surface undulated, though not to the extent found in the leaves of *flabellifer*, which also are smaller. The petioles are heavy, six to seven feet long and with the upper margin on each side armed from base to apex with black, elongate, jagged processes whose outer edge is knife-sharp. Two of our palms flowered for the first time in April of this year, and both proved to be males, sending out several inflorescences from which curious thickened branches appeared, bearing on their surface the small male flowers. Since the sexes are in different palms the flowering of other specimens is awaited in the hope that females will be present and thus allow seed production.

Both of the foregoing species should grow well in South Florida as they are suited to limestone soils, but one of the drawbacks to the wide planting of these magnificent palms is the requirement of growing them in place, from seed, as it has been found impossible to transplant specimens of any size or age. Greenhouse production of plants will not prove easy because of the manner in which the seed germinates. The seeds are large, several inches across and over an inch thick, and from them a thickened hypocotyl is produced that penetrates well over a foot into the



Figure 3. Ten-year old Bismarckia nobilis with its first crop of fruits which are nearly hidden by the intervening leaf petioles.



Figure 4. The fruiting inflorescences, in foreground, rise from separate leaf axils of Bismarckia nobilis, while on the petiole guarding the upper inflorescence clusters of woolly fibers are evident at base and beyond middle.

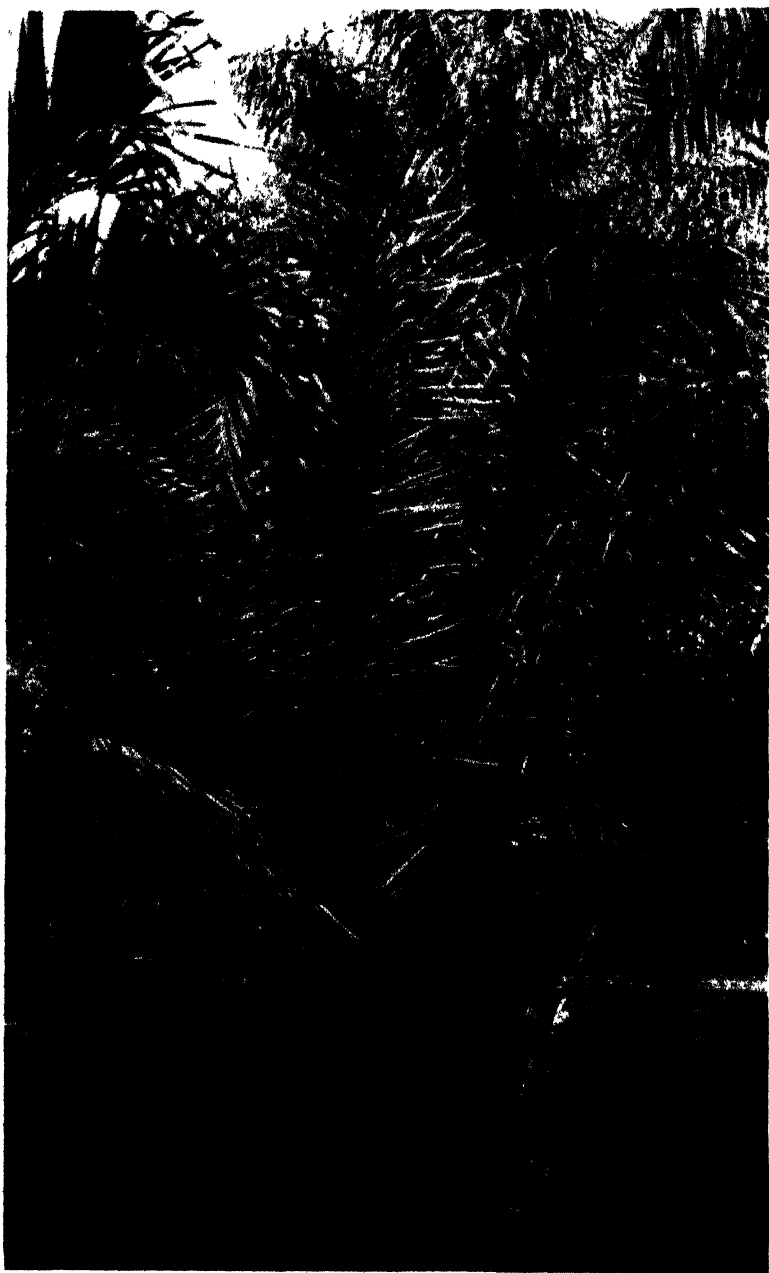


Figure 5. The "Curua palm," *Attalea spectabilis*, 20 feet high at the time of its second fruiting.



Figure 6. Basal portion of "Curua palm" showing its almost trunkless condition, the thick-walled spathes and a large fruit cluster as well as a similar, older one.

ground and from near the base of this hypocotyl the first leaf is produced and eventually pushes upward and above ground. These hypocotyls are considered a food delicacy by Indian natives and great numbers of seeds are planted in beds for their production. Under greenhouse conditions, where plants are desired, single seeds should be placed in individual containers of considerable diameter and depth where the seed can send down its hypocotyl and the young seedling make unrestricted growth for a few months. Even with these precautions it has been found difficult to set such plants in the field and have them survive. Wide planting of these palms must await importation and placement of viable seed or production of a home supply which it is hoped our palms may provide.

A rare palm that bears rather close resemblance to the common species of *Latania* is *Bismarckia nobilis* Hildebr. et H. Wendl., a native of Madagascar where it grows to a considerable height. Seeds of this palm were collected there at Majunga in the summer of 1934 by Dr. Thomas Barbour of the Agassiz Museum, Cambridge, Mass., and turned over to our headquarters office in Washington where they received P. I. No. 106556 and were forwarded here. From the 11 seeds that arrived, two seedlings sprouted and these have grown until one of the palms, a female, has flowered for two seasons and the other is of a size where flowering may be expected. It is hoped that this latter palm will prove to be a male so that fertile seeds may be produced and allow distribution of this handsome species.

This palm, as shown in Figure 3, has a stout, naked trunk gradually diminishing in diameter instead of being rapidly narrowed above the broad base as are the *Latanias*. The leaves have much the same silvery gray-green color

of *Latania* leaves, but are a little larger and more open in appearance because they are less folded. They are held with little drooping on long unarmed petioles. Small, twisted patches of coarse fibers five or more millimeters in length are found on the under side of the midribs of the pinnae, on the basal leaf sheathes and beneath the outer half of the petioles. The inflorescences project from the axils of the leaves in the lower part of the crown and branch simply. The fruits that were formed without fertilization in 1944 were mahogany brown and about an inch in diameter, probably considerably smaller than fertile ones would have been, but they were decidedly ornamental as Plate 4 will show. Many of these fruits from the first flowering persist on the branches below the clusters that formed in the spring of this year and now have reached the size of the earlier fruits.

The two palms have made more rapid growth than do the *Latanias* and have withstood cold weather as well. They appear well adapted to limestone conditions and, when additional plants become available, it should be found possible to establish them throughout the southern half of the state.

The American tropics, especially Brazil, contain a large number of species of feather-leaved palms belonging to the genus *Attalea* and to closely related *Orbignya*. Some of these palms attain great size and have leaves 40 feet or more in length, thus surpassing all other leaves of the plant world. Other species, however, are very much smaller and are trunkless or nearly so but still with the characteristic leaves of the large forms, although smaller.

One of the latter group described by Martius as *Attalea spectabilis*, but later transferred to the genus *Orbignya* by the German palm specialist, Burret, was introduced as seed through the

Washington Office in 1926 and 1927 and given P. I. No. 79560. Although a native of Brazil this seed had been grown in the Buitenzorg Botanic Garden of Java. Another introduction of this species from Trinidad in 1932 under P. I. No. 97543 failed but one plant of the former number was received from Washington in 1929 and has been established in the field. Mowry, cited previously, indicates planting of an *Attalea* in Florida but is doubtful of its being *spectabilis*. In Brazil this palm has several native names, principal of which is "Curua." As with related palms its leaves are used for thatching and some oil may be extracted from the seed kernels for local use and possible export.

The "Curua" palm here now has its second crop of fruit. The entire stem of the palm is not over six feet in height but the central leaves project another 14 or 15 feet upward with most of the outer leaves sharply ascending with slightly arched tips. Figure 5. Only near the ground might the plant be said to have a trunk and this is encased in the old leaf-bases. The leaves have pinnae closely crowded along the dark purple rachis from tip almost to the base, the longest of them slightly exceeding four feet. The inflorescences appear from the axils of the leaves, being enclosed in long slender spathes that split lengthwise and allow the

flower spike to escape. These opened spathes are somewhat boat-shaped, very thickwalled, deeply channelled longitudinally on the outer surface and ending in a solid attenuated tip 8 to 10 inches long, frequently ending in a curve or hook. Similar spathes of other palms are being extensively used for decorative purposes and those of the "Curua" palm unquestionably will be much sought after when they become generally available. The flower spike, when it first appears, is held rigidly upright but as the fruits begin to develop their weight usually causes the stem to bend gracefully outward. (Figure 6.) Many fruits, about the size of a hen's egg but more conical, are densely crowded around the outer half of the flower stem, each fruit being directly attached to the stem by a short pedicel. Firm flesh surrounds the elongate oval and very heavily-walled seeds which contain from one to five slender, elongate and well separated kernels.

From the present crop of fruits, which appear to contain fertile nuts, it is hoped that a sufficient number of seedlings may be obtained to allow wide placement in the subtropical test portions of the state. Trunkless exotic palms are novelties that few gardens can boast and the "Curua" palm, with its arched, dark green fronds rising from near the ground, will be found one of the most beautiful additions.

Bamboos in American Horticulture (III)

ROBERT A. YOUNG*

THE HARDY RUNNING BAMBOOS

(Continued from page 291)

In this issue some more of the medium-sized and several of the truly giant species of the genus *Phyllostachys* will be considered. Like those illustrated and described in the preceding number of the Magazine, these bamboos endure minimum winter temperatures of around 5° Fahr. with little injury, though there is some variability in their cold resistance. At lower temperatures cold injury rapidly increases and, as has been previously stated, killing of the leaves, branches, and finally of the culms usually results at a few degrees below zero; injury to the rhizomes also may occur unless there is a good mulch of litter or snow.

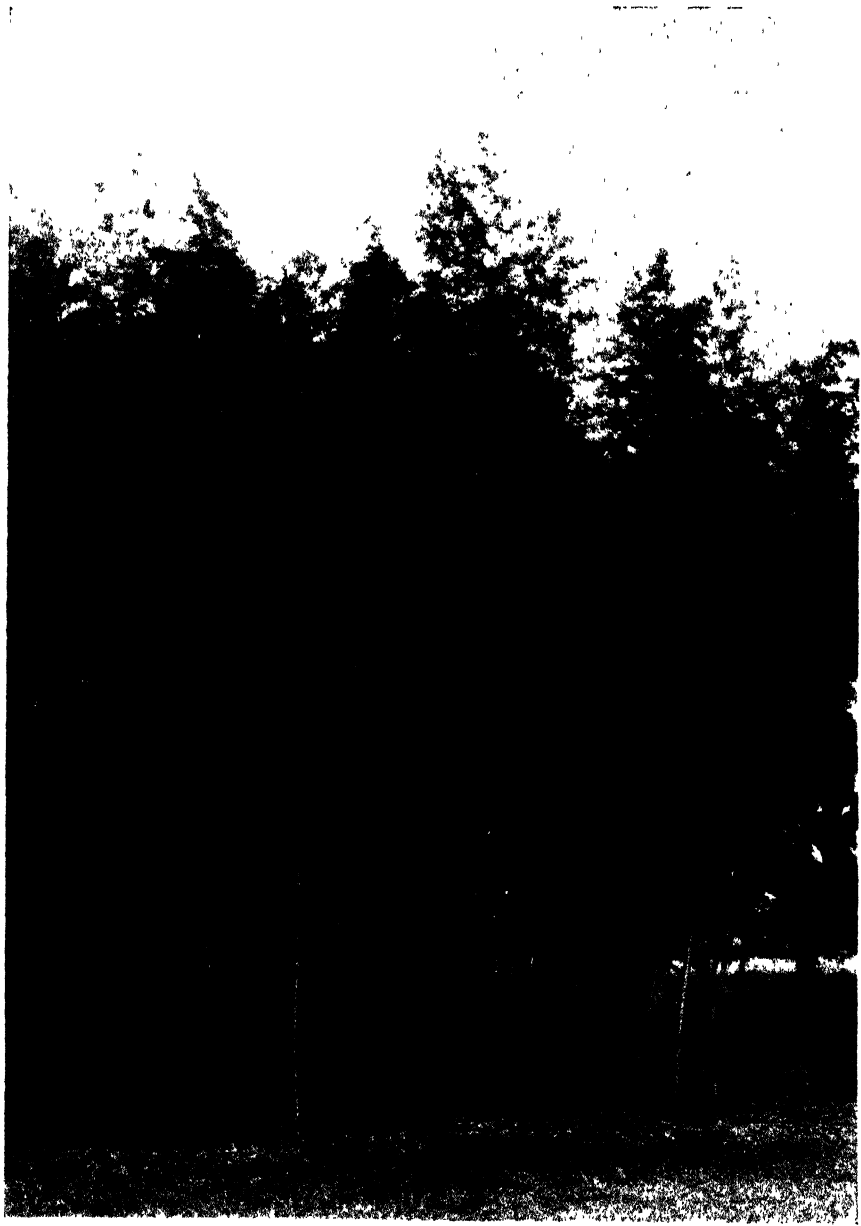
Phyllostachys dulcis McClure, a Chinese bamboo shown in the photograph on page 41, is a valuable edible species, unique in important respects. Of especial interest is the entire absence of the more or less bitter taste of the uncooked shoots, that is common to those of practically all other bamboos. It was in allusion to this character that the specific name *dulcis* was given, and this quality also suggests the common name "sweetshoot" bamboo as being appropriate. The culms are of larger diameter for their height than are those of any other known species of *Phyllostachys*, which results in the production of shoots of worth-while size for eating considerably earlier in the life of a plantation than with any of the other species. The further fact that, under equal conditions, shoots (and culms) of maximum size for the spe-

cies are produced after fewer years than with any related bamboo known adds materially to the potential value of the sweetshoot bamboo as a source of shoots for food. The mature culms are said to have little or no industrial value.

This species was collected at Tangsi, in Chekiang Province, China, in 1908, by the late Frank N. Meyer, agricultural explorer of the U. S. Department of Agriculture. It was reported to be the most popular of the edible bamboos in that region of China. Its local name at Tangsi is said to be Pah koh poo chi. The plant has an interesting history in this country. Received from China without scientific name, it was sent, among other species, by the Department to Mr. E. A. McIlhenny, Avery Island, La., where the plants burst into flowering after 2 or 3 years. As is usual with bamboos, the foliage was almost completely suppressed and also, as rather rarely happens among the species of *Phyllostachys*, the plants persisted in flowering until nearly all had perished. By taking a single remaining plant into the greenhouse and coddling it, Mr. McIlhenny succeeded in bringing it out of its flowering mood, and it became the source of all the material of the sweetshoot bamboo now in the United States. All the plants grown elsewhere had previously been lost.

P. dulcis as grown at the Barbour Lathrop Plant Introduction Garden has in recent years attained a height of 32 feet, with a culm diameter of 3 inches near the base. The culm sheath is almost perfectly smooth, is pale green

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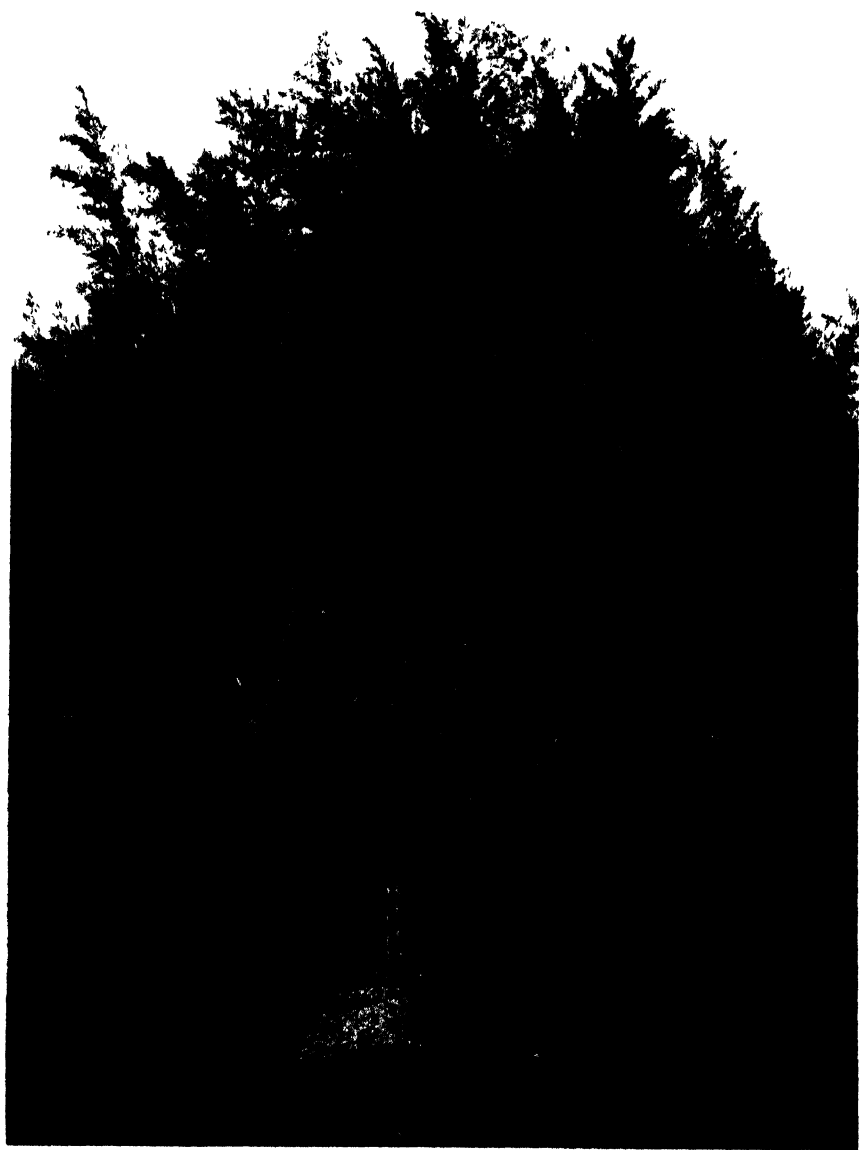
Phyllostachys dulcis, the Sweetshoot bamboo, the common hardy edible bamboo of central China, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. Culms of very large relative diameter—3 inches in 32-foot culms shown here.

to yellowish with small brownish spots and streaks when fresh, and dries to a straw color, the spots remaining. The "reduced blade" of the culm sheath is rather narrow, as in most other species of *Phyllostachys*, and is usually somewhat curled or crinkly. The leaves, usually 3 or 4 on a twig, are 2-6 inches long by $\frac{1}{4}$ - $\frac{7}{8}$ inch wide; they are medium green and smooth above and glaucous beneath, as in most species of the genus.

The sweetshoot bamboo was identified as *P. henryi* at the time of its flowering and was sent out under that name by the Department of Agriculture for a period in later years, but some two years ago the identity was questioned by Dr. F. A. McClure, the specialist on Chinese bamboos. He found "no discernible basis" in the vegetative characters for the identification and no flowers were available. He has therefore recently described this bamboo (Journ. Wash. Acad. Sci. 35: 285-286. Sept. 15, 1945) as a new species under the name *P. dulcis* used here.

P. nidularia Munro, shown on page 43, is a Chinese bamboo of medium-large size, attaining heights up to 33 feet. The new leaves in the spring are at first 3 or 4 on a twig but the lower 2 or 3 commonly fall after 2 months or so, leaving only 1 or occasionally 2 leaves on a twig until the following spring; the blades are 2-5 inches long by $\frac{3}{8}$ - $\frac{3}{4}$ inch wide. The leaf form and size among the several introductions that have been made vary considerably, perhaps even more than in the other species of *Phyllostachys* being considered here. An outstanding character of *P. nidularia*, and one by which the species may readily be identified with considerable confidence in the spring, when one has once become acquainted with it, is the pair of very conspicuous clasping auricles at the juncture of the culm sheath and blade; these auricles

are quite smooth and without marginal bristles. The sheath proper is green, often with noticeable whitish stripes converging upward toward the apex. The Department of Agriculture has a number of introductions of the species, apparently of at least 2 or 3 different seedling origins, — from Kwangtung and Anhwei Provinces, China. Some differences in apparent maximum height and in leaf characters among these various introductions are noticeable, and it is likely that some differences in the qualities of the young shoots for food and the quality of the wood of the mature culms may later be found. According to the notes of the collector, Dr. F. A. McClure, made at several points of collection in China, such differences in marked degree appear to have been observed by the Chinese. The split culms of *P. nidularia* are reported to be sometimes used by them for weaving. The internodes of the culms are longer than in many other species, those near the middle of a 25-foot culm being up to 18 inches. Their value for fishing poles and other industrial uses in the United States has not been studied but it is safe to say that they will serve as fishing poles, plant stakes and for other ordinary uses. A number of local names for this species in different localities of the provinces mentioned were recorded by Dr. McClure. At various points in Kwangtung Province the names Tai Ngaan chuk, Fa hok chuk (a variety with superior shoots), Kan chuk, So pa chuk, Kam sz chuk, Pat sun chuk, and Lak cha chuk were in use. (The last two names are from Honan Island, near Canton.) As may be surmised, "chuk" stands for bamboo. From a locality in the Lung T'au Mountains comes the name Nai chuk, and from Anhwei Province, Shui chuk. No English name for *P. nidularia* has yet been coined, and except for the prominent



Phyllostachys nidularia, a medium-tall and rather slender Chinese bamboo with edible shoots. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

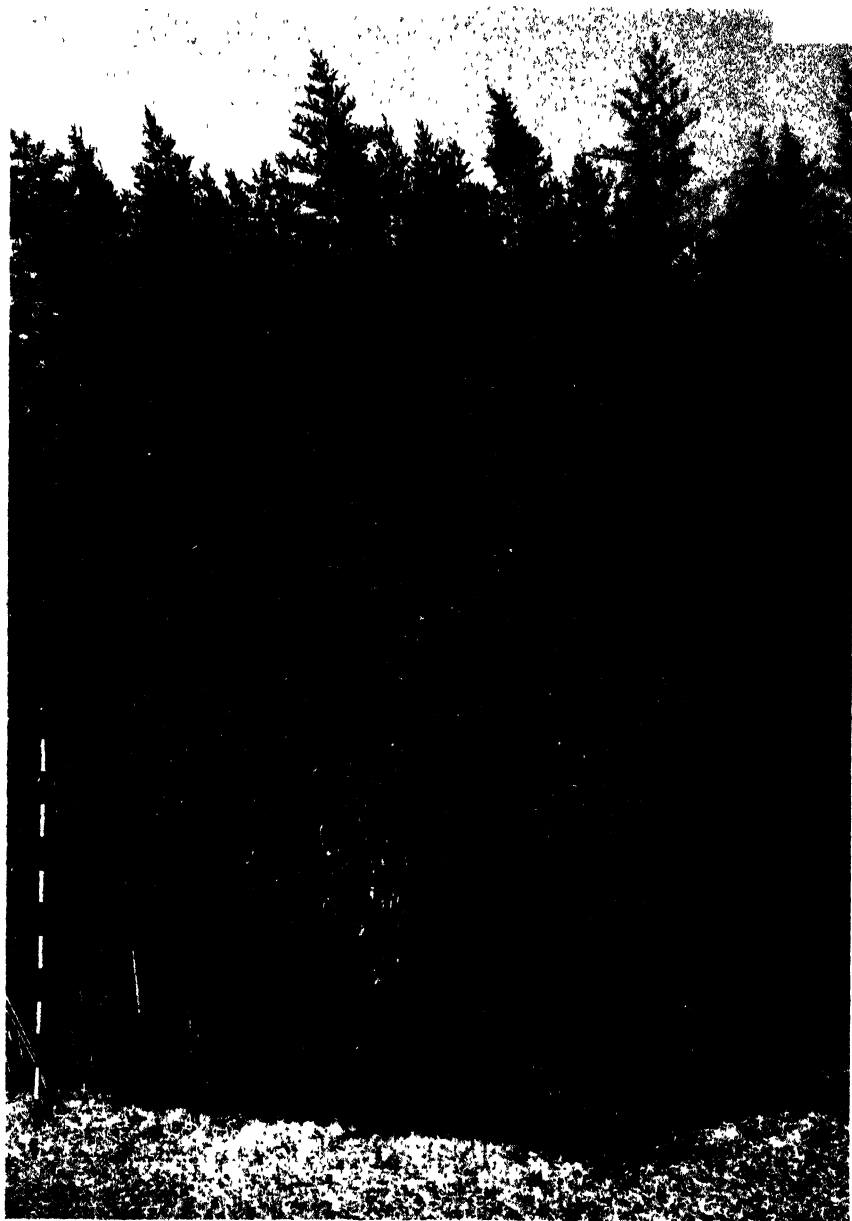
auricles mentioned, at the apex of the culm sheath, there seems not to be any very distinctive character to suggest an appropriate common name.

P. meyeri McClure, another medium-large bamboo from China, is shown on page 45. It was collected by Frank N. Meyer in Chekiang Province in 1908, for the Department of Agriculture, but the record as to exact locality is lacking, for the same reasons mentioned in the discussion of *P. aureosulcata* in the October number. The common name "Meyer bamboo" has been adopted for this species. For a brief period the name "dwarf hardy bamboo" was used for it but as the name later seemed not to be either distinctive or particularly appropriate, it was dropped. No other collection of the plant in China has yet been made as far as known. The height of 35 feet for *P. meyeri* at the U. S. Barbour Lathrop Plant Introduction Garden, indicated in the legend for the photograph, has been attained only in very recent years, and there is a possibility that culms of somewhat larger size may yet be produced. The diameter of the larger culms is about $1\frac{1}{8}$ inches near the base.

It is scarcely possible to describe the Meyer bamboo in non-technical terms that will enable one to separate it easily and with certainty from several others. In some respects it closely resembles *P. aurca*, but it differs sharply in having none of the occasional crowding of the lower nodes of the culms that is rather frequent among the culms of the latter species. Also, the ligule (upward extremity of the sheath proper, inside the base of blade) of the culm sheath of *P. meyeri* is more brownish and a little more conspicuous than in *P. aurca*. The sheath itself is more or less smoky-spotted or blotched, especially on the upper part. In mature plants the leaves usually are 2-3 on a

twig and are rather narrow, 2-5 inches long by $5/16$ - $5/8$ inch wide. *P. meyeri*, having only recently been described and named (Journ. Wash. Acad. Sci. 35: 286-288. Sept. 15, 1945), has been sent out by the Department of Agriculture as *Phyllostachys* sp., for many years, first under the incorrect *P. I.* number 23234 (for reasons previously indicated) and later under *P. I.* No. 116768, which it now bears. It is a valuable bamboo for fishing poles, harvesting of nuts and for the very numerous other purposes for which its size would adapt it.

P. rubromarginata McClure is also a Chinese bamboo of medium-large size. Culms up to at least 37 feet in height are on record, though more often they are considerably smaller. A view of an area with culms up to 30 feet high, at the U. S. Barbour Lathrop Plant Introduction Garden, is shown on page 47. This plot was grown from plants collected on the banks of the West River, near Wuchow, Kwangsi Province, by Dr. F. A. McClure, for the U. S. Department of Agriculture. A plot at the same garden, grown from plants collected in Kwangtung Province, has produced culms of the greater height (37 feet) mentioned, while in one from another locality the maximum height thus far is only 25 feet. It seems likely that these plots represent different clones, of different seedling origins. The culm sheaths of *P. rubromarginata* are plain green, with a reddish margin, when fresh, and the specific name was suggested by the reddish color of the margin. The sheath dries to a fairly uniform straw color; it tapers to a rather narrow, truncate apex and is surmounted by a ribbonlike blade. The leaves are at first 3-4 on a twig but the lowest one falls early, leaving 2-3; they are somewhat broad for their length, ranging from 2-6 inches long and from $7/16$ - $15/16$ inch wide.



D. A. Bisset

Phyllostachys meyeri, from central China, named for the former agricultural explorer, Frank N. Meyer. A bamboo growing to 35 feet high, valuable for many purposes. Pole at left is 12 feet high. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

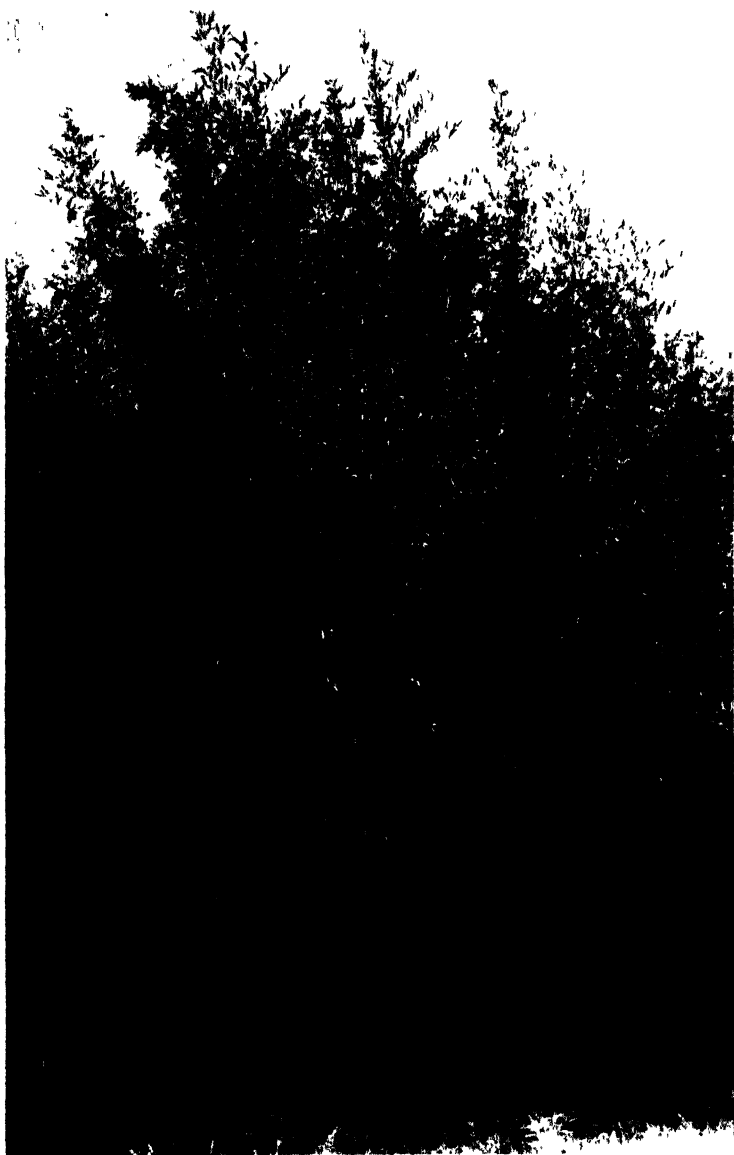
P. rubromarginata has not been much tested as yet for industrial purposes but it appears to be fairly suitable for light fishing poles and probably for use in harvesting nuts. A slight disadvantage is a tendency for the internodes to be a little curved, but for many purposes the almost imperceptible curve is likely to be unimportant. The internodes of culms 25-27 feet high range up to 15 inches in length. No common English name has been suggested for this species. In the locality near Wuchow, China, the usual vernacular name was reported as Koon yam chuk.

P. congesta Rendle, shown on page 48, at somewhat less than half its recorded maximum height, is one of the smaller of the giant species of *Phyllostachys* when it reaches its full size. A height of 43 feet attained several years ago was reported by Mr. E. A. McIlhenny at Avery Island, La., and this may have been exceeded since. This species is another of the early (1908) bamboo collections made in Chekiang Province by Frank N. Meyer, of which plants placed with Mr. McIlhenny were the only ones that survived. This is also one of the species for which the exact locality of collection is not now known. It should perhaps be stated here that the identification of this plant may possibly later be subject to correction, since there are several very closely related bamboos, similar in appearance, that may be involved and there is still some uncertainty as to whether our present one actually represents the type of *P. congesta*.

The plain green sheaths of the young culm shoots are so smooth and fit so closely over one another that they suggest fish scales. This has given rise to the name "fishscale bamboo." The character mentioned is of course in evidence only in the early spring, when the new shoots are in an early stage of

growth. Foliage specimens of this bamboo collected from culms of different ages seem to show exceptional diversity in size, shape, and shade of green of the leaves, though considerable variability in certain respects is of course found in all the species. The leaves, which are rather thin, are at first 3-6 on a twig but the lower 1 or 2 always fall before autumn; they are $1\frac{1}{2}$ - $4\frac{3}{4}$ inches long by $\frac{5}{16}$ - $\frac{3}{4}$ inch wide. The culm of the fishscale bamboo is rather short jointed, comparatively thin walled, and not very strong, so that its industrial value apparently will be low.

Phyllostachys sp., P. I. No. 146420, shown on page 51, as it is growing at the U. S. Barbour Lathrop Plant Introduction Garden, is one of the smaller giant species in respect to height, but the culms are exceptionally slender. A 45-foot culm—one of the tallest—has a diameter of only $2\frac{1}{4}$ inches near the base. The exact origin of this Chinese bamboo is not known. It was among the numerous other species collected by Dr. F. A. McClure for the Department of Agriculture, but when first closely observed at the above garden it bore the designation of another, quite different species, so that it had to be considered as a "stray." In culmsheath characters it so strongly resembles *P. bambusoides* that for a time it was thought to be simply a form of that species. Later, however, Mr. D. A. Bisset, in charge of the garden mentioned, recognized several points of marked difference, including slenderness of culm and the exceptionally dark-green color of the upper surface of the leaves. The dark green contrasts sharply with the brilliantly glaucous under surface, especially when the lower surfaces flash into view in a breeze. The tall culms with their small diameters and the apparent toughness of the wood give this unnamed bamboo considerable promise for use in the har-



D. A. Bisset

Phyllostachys rubromarginata, a slender-culmed Chinese bamboo, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. Tallest culms in this group are 30 feet but heights up to 37 feet are on record.



Phyllostachys congesta (left), and *P. vivax* (right background), two of the giant hardy bamboos of central China, in early stages of development on McIlhenny Estate at Avery Island, La.

vesting of pecans, and the straighter culms may also meet some of the special needs of fishermen for long slender poles. Many of the culms develop a conspicuous curve in their growth.

P. sulphurea var. *viridis*, R. A. Young, the green sulfur bamboo, is a giant Chinese bamboo, said by J. Houzeau de Lehaie to have been introduced into Europe in 1856 and distributed to various points, including the Botanic Garden at Hamma, near Algiers. He also stated that a weak plant flowered at Hamma the following year, though no description of the flowers was made or any specimen preserved. The flowers are still unknown. A grove at the Barbour Lathrop Plant Introduction Garden, with culms up to 43 feet high,

is shown on page 49. Heights up to 16 meters (52 feet) for this bamboo, under the invalid name "*P. mitis*," were reported from France many years ago but there is some reason to believe that a larger and entirely different species (*P. edulis*) was confused with it. Two different clones of *P. sulphurea* var. *viridis*, from French sources, were introduced by the Department of Agriculture some years ago, one of which, shown in the photograph, is much larger and more vigorous than the other. At the Savannah Garden the smaller clone has not produced culms taller than about 15 feet, though it had been reported in France sometimes to reach 35 - 38 feet.

The culm sheaths of *P. sulphurea*



D. A. Bisset

Phyllostachys sulphurea var. *viridis*, a hardy giant Chinese bamboo with robust culms, first introduced into France and Algeria. Culms here are up to 43 feet.
At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

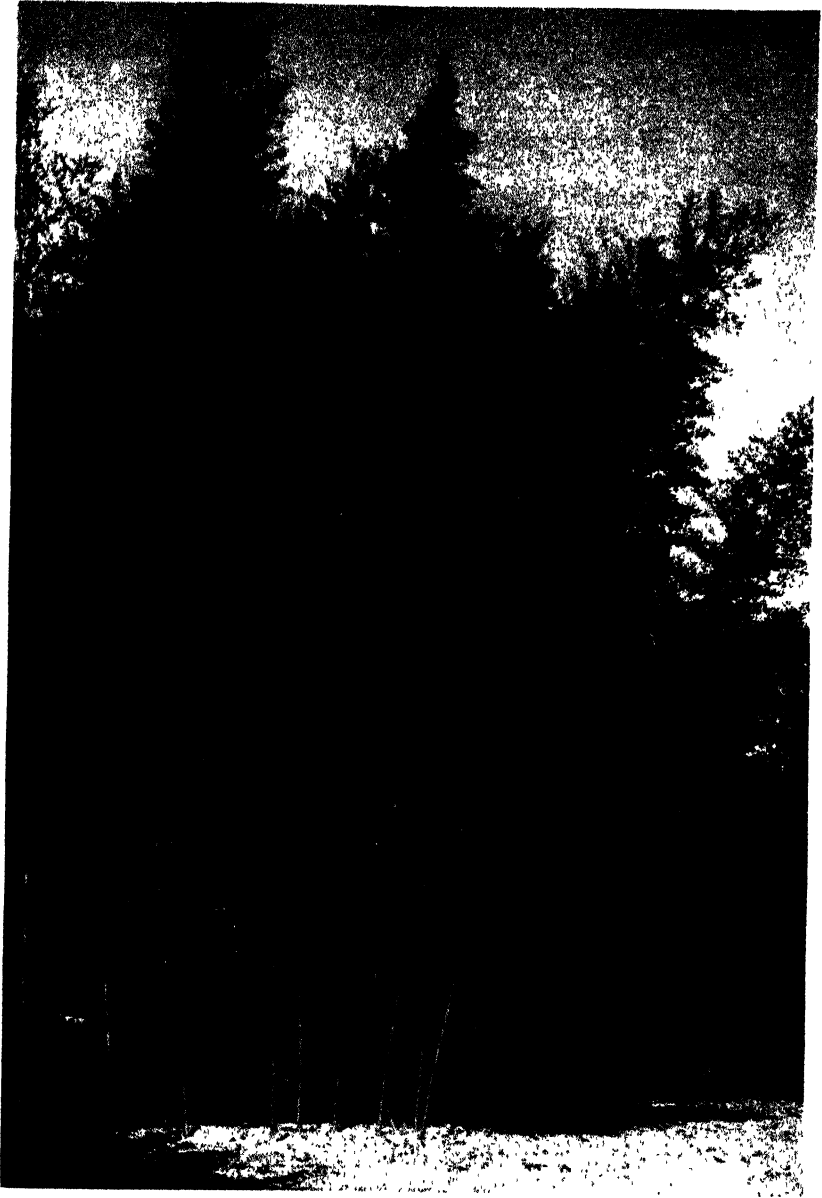
var. *viridis* are perfectly smooth both on the surface and the margins. The lowest sheaths when fresh are brownish yellow, those higher on the culm gradually merging into yellowish green; all are more or less blotched, spotted, or speckled with dark to light brown. The leaves are borne in 2's or 3's on the twigs and are 2-5 inches long by $\frac{3}{8}$ - $\frac{3}{4}$ inch wide. There are no published data on the physical properties of the culms, nor is there wide practical experience as yet in this country in using them industrially, but it seems likely that the culms of the more robust-growing clone will prove to have at least moderate value, including such uses as fishing poles and rug poles.

The green sulfur bamboo, as the name indicates, is treated as a variety of the sulfur bamboo, *Phyllostachys sulphurea*. The plant was first described (at the same time as *P. sulphurea*) by A. & C. Rivière, from Algiers, in 1879, under the name "*P. mitis*." That name was mistakenly based on *Bambusa mitis* Poir., a bamboo now unidentifiable but, from the description, known not to be any species of *Phyllostachys*. These circumstances made necessary the renaming of the so-called *P. mitis*. *P. sulphurea*, as stated in the preceding paper, is considered biologically to be a garden variety of the much larger, green-culmed plant we are here considering, but since it had been named in 1879, it was necessary to retain its specific name and, under the rules of botanical nomenclature, the entirely green plant, believed to represent the true wild species, had to be made a nomenclatural variety of the small, yellow-culmed plant. This was done in 1937 (Journ. Wash. Acad. Sci. 27: 343-346, Aug. 15, 1937). For a considerable time the name *P. mitis* was also misapplied to the bamboo we know as *P. edulis* (*P. pubescens*). Neither *P. sulphurea* nor

P. sulphurea var. *viridis* is believed to be grown in Japan, though some of the Japanese botanists apparently have in the past confused the name *P. sulphurea* with one of the yellow-culmed varieties or forms of *P. bambusoides*.

P. nigra var. *henonis* Stapf ex Rendle, which we may call the Henon bamboo — a name already adopted by Standardized Plant Names — is another giant Chinese bamboo, also cultivated widely in Japan. The Japanese name is Hachiku. A photograph of a small grove with culms up to 45 feet high, at the Barbour Lathrop Plant Introduction Garden, appears on page 53. Heights up to 54 feet elsewhere in this country are on record. The culms are a little smaller in diameter for their height than in most of the related giant species and are thinner walled, so that their industrial value is not very high. The medium-sized culms, however, have been used to a considerable extent in some localities for the harvesting of pecans, and they should be useful as rug poles and for other purposes for which culms of greater strength are not required. Smaller culms will serve for light fishing poles. The edible young shoots are excellent for eating and are reported to be esteemed in the Orient especially for the slight fragrance that is given off when they are cooked.

The leaves of the Henon bamboo are rather small—rarely 4 inches long or much more than a half inch wide; they are usually borne 2 on a twig, rarely 1 or 3. The new shoots in the spring, with what I have called their clear mauve-colored sheaths, surmounted by the vivid green, crinkled blades and deep-purple auricles and bristles, are very beautiful if one will take time to look at them a little closely. As to the color of the sheath, it can also be described in other terms. Dr. T. Nakai, for instance, describes it as light green-



Phyllostachys sp., P. I. No. 146420, an undescribed species of hardy bamboo from southeastern China, of promise for long, slender fishing poles and for harvesting nuts. Culms up to 45 feet high. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

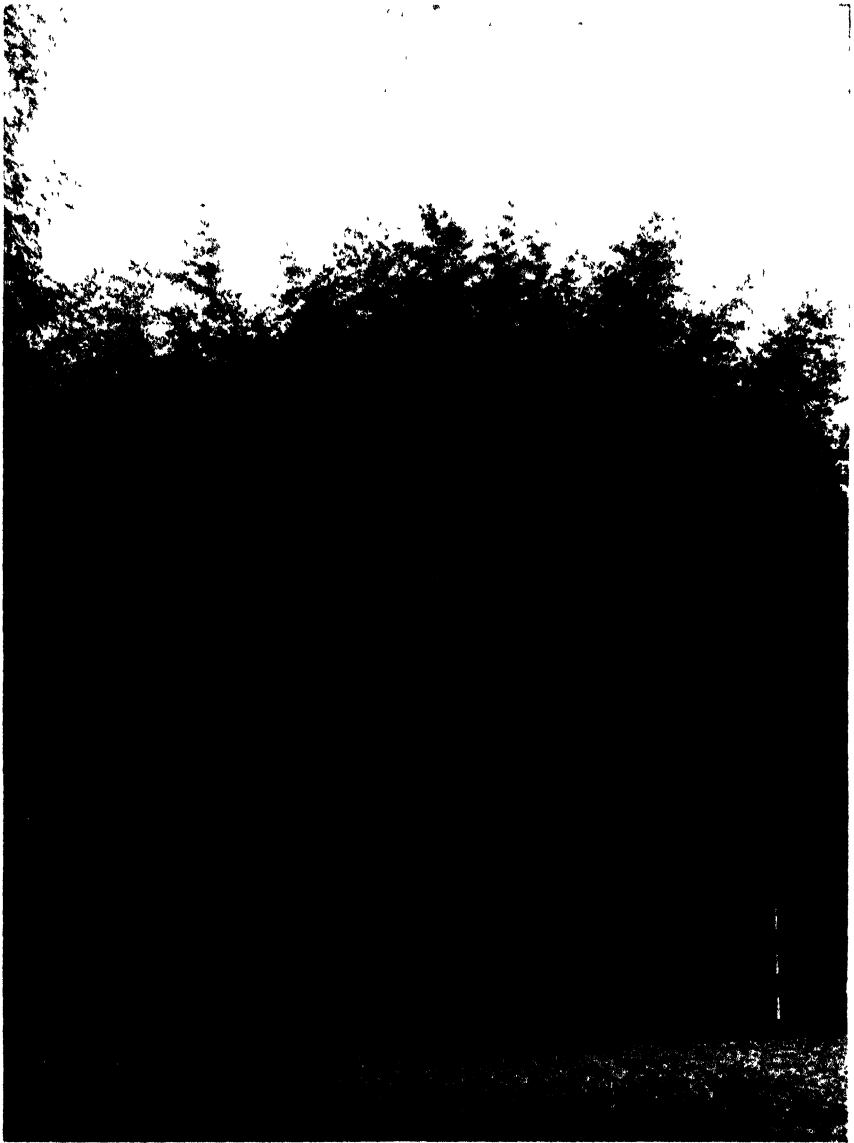
ish brown or light reddish brown, either of which seems to me not inappropriate. Altogether, this is a handsome bamboo. The late A. B. Freeman-Mitford (later Lord Redesdale) of England, in his highly informative and delightfully written little book "The Bamboo Garden" (1896) is lavish in praise of the grace, health, and generally excellent behavior of this bamboo in his garden. It is reputed to be, if anything, a little more cold resistant than most of its relatives, though in a favorable environment several others may outstrip it in speed of development to their maximum sizes.

Although *P. nigra* var. *henonis* was introduced into Europe in the late eighties of the last century by a French physician, Dr. Henon, for whom it was named, there is no known record of its having been successfully introduced into the United States and established until 1908, when Dr. David Fairchild, who was largely instrumental in organizing the work of foreign plant introduction in the Department of Agriculture, arranged for the importation of plants of this and two larger giant species from Japan. A first importation in 1904 apparently had failed at all points to which plants were sent. Dr. Fairchild had given especial attention to the more important bamboos cultivated in Japan in 1902, during a stay of several months studying the useful plants of that country, with his friend Mr. Barbour Lathrop. Both men became convinced of the potential value of the bamboos for growth and utilization in the United States, and Dr. Fairchild wrote an excellent and informative paper on the subject, which was published in 1903 as Bureau of Plant Industry Bulletin No. 43 (now out of print).

Quite briefly, I must mention that plants of the 1908 introduction of *P. nigra* var. *henonis* (*P. henonis*) were placed by the Department of Agricul-

ture with Mr. E. A. McIlhenny, at his Avery Island estate in southern Louisiana, among other experimenters, in 1910, and that, again, his plants were the only ones of that introduction that lived to become fully established. There is another grove of this bamboo, at Caspiana, La., not far from Shreveport, also started many years ago, by a Mr. Hutchinson. In 1929, when I first learned of the existence of this grove, it was stated by his son, Mr. C. C. Hutchinson, that the original "root" had been put out by his father about 35 years before. This would have been about 1894. Mr. C. C. Hutchinson, Jr., of Shreveport, La., writes that present members of the family have no knowledge of the source of the original root but that from his early recollection of the grove he believes that the approximation of the year of planting given earlier by his father was about correct. Plants of the 1904 importation mentioned above were sent to Mr. J. F. Shoemaker, Crowley, La., in 1905 and there is a report that a grove developed from these and thrived for a number of years. No relation between these plants and the one that Mr. Hutchinson planted at Caspiana is yet known but unless a connection can be established the origin of the Hutchinson plant is likely to remain a mystery.

If we did not have other basis for a common name for *P. nigra* var. *henonis*, I suppose we should have endeavored more seriously to adopt the name Hachiku into general use in the Western World, but the form and pronunciation of this name are so strange to the eye and ear of persons not familiar with Japanese names that it has seemed better to use the name of the man who earlier had introduced it into Europe, — even though persons unfamiliar with French pronunciation may also stumble over it! It might be



Phyllostachys nigra var. *henonis*, a giant hardy Chinese and Japanese bamboo with slightly fragrant edible shoots. Tallest culms here are 45 feet high, but elsewhere they have exceeded 50 feet. At U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

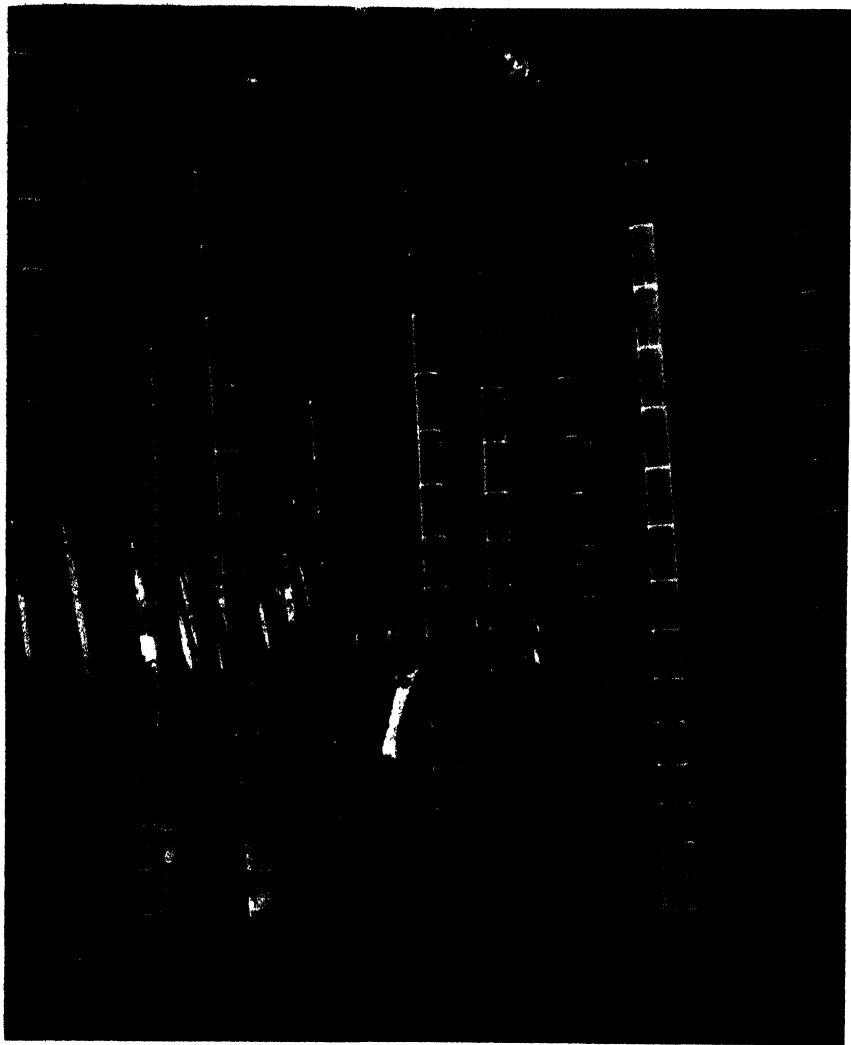


Phyllostachys edulis, the Moso bamboo, most important of the edible bamboos of China and Japan. Tallest culms here are about 40 feet but heights exceeding 70 feet for this species are known. At electric power house, Anderson, S. Car.

justifiable in ordinary horticultural usage to shorten the present scientific name to *P. henonis*, the name by which the plant was known in Europe before its relationship with *P. nigra* (Lodd.) Munro was recognized. There would be no ambiguity in the shortened name, and there would be the precedents established by nurserymen with numerous other plants of often omitting the specific name and using a varietal name in its place. A brief account of the circumstances under which *P. nigra* var. *henonis* came to be called a variety of *P. nigra* instead of the reverse of this, was given in the discussion of *P. nigra* (in the October issue). Syno-

nyms besides *P. henonis* are *Bambusa puberula*, *Phyllostachys faurieri*, *P. puberula*, and *P. nigra* var. *puberula*.

P. edulis (Carr.) Houzeau de Lehaie, the Moso bamboo, is shown in two photographs, on pages 54 and 55, the former giving a general view of a grove in the city of Anderson, S. Car., and the latter a close view in another grove of the lower sections of some new and older culms of this handsome giant species. The whitish surface of the internodes of many of the culms in the foreground—culms of the current year—is due to a very short-velvety silvery pubescence that is characteristic of the new culms of *P. edulis*



View in grove of Phyllostachys edulis in City Cemetery, Anderson, South Carolina, with several new culms (whitish surface) in foreground. (Francis R. Fant, of Anderson, in center.)

for a period after the sheaths fall. As this gradually disappears the surface appearance of the internodes becomes green, except for the conspicuous whitish waxy ring just below each node. The original plant, from the propagation of which the grove in the first picture grew, was obtained from a San

Francisco dealer by the late Rufus Fant of Anderson about 1893, although the grove shown in the general view is understood not to have been started until around 1916. This species is native to China, though now and for many years extensively cultivated in Japan and also to some extent near

Batum, Transcaucasia, U.S.S.R. The culm sheaths, which are blackish brown and densely pubescent, are highly distinctive and are serviceable for identification. Although culms of the Moso bamboo are not known to have attained heights greater than about 70 feet in this country, they have been reported to reach 80 and 90 feet or more in China. The diameters are larger for the height than in any of the other giant species. But the leaves are the smallest — seldom longer than $2\frac{3}{4}$ inches or much wider than $\frac{1}{4}$ inch on mature culms. The foliage presents an exceptionally beautiful feathery effect.

The new shoots of *P. edulis* appear earlier in the spring than do those of other species, with few exceptions. Partly for this reason, no doubt, but probably more because of the excellent quality of the shoots and the large diameters to which they often grow, this bamboo is very highly esteemed in parts of China in which it will thrive. It is understood to be commonly known as Mau chuk in Kwangtung Province, and in Chekiang (at Tang-si), by the variant name Mao tsoh. In Japan, where it is reported by Dr. T. Nakai to have been introduced about 1736, it is very generally called Mosochiku; "chiku" is one of two Japanese words meaning bamboo, the other being "dake," or its equivalent, "take."

Moso, the distinctive part of the Japanese common name for *P. edulis*, is said to be the name of a highly honorable legendary character and to have been applied to this bamboo to indicate the great esteem in which it is held. "Moso bamboo" has already been adopted by Standardized Plant Names as the English common name for this species and I believe it is more suitable, all things considered, than any other that might be chosen. Some years ago the name "giant hairy-sheath edible bamboo" was proposed, but al-

though it is descriptive it is too cumbersome. Moso is short and easy to pronounce and, as already indicated, is well established in a common name in which the species has become economically important. A monograph in Japanese, detailing methods of propagation and culture, was published about 15 years ago, and that a translation, condensed and sometime be published, and would be helpful to the very few persons interested in the United States and of interest among other farmers and scale gardeners. At present the problem of the commercial propagation of this bamboo remains largely unsolved. I know of only about eight groves of it in the country and four of these are in and near Anderson, S. C. The other four are at Avery Island and Abbeville, La., and the U. S. Lathrop Plant Introduction Station near Savannah, Ga.

The Moso bamboo grown at Abbeville, La., was started in 1905 by the late Dr. C. J. Edwards, with plants introduced the preceding year by the Department of Agriculture under arrangements made by Dr. David Fairchild, agricultural explorer. Plans of this importation placed with several other experimenters all failed. The Avery Island plantings were started by Mr. E. A. McIlhenny in 1910 from plants of another importation (1909) by the Department. These plants were the only ones of this introduction that survived. The Department's grove near Savannah was started from rhizomes obtained in 1926 by Mr. D. A. Bisset, in charge of the Savannah Garden, through the courtesy of Mr. Rufus Fant, from a grove in the city cemetery of Anderson. This latter grove, incidentally, was started about 1911.

No detailed reports on the condition of the several groves at Anderson have been obtained for a number of years.



D. A. Bisset

Phyllostachys vivax, an exceptionally vigorous giant hardy bamboo from Chekiang Province, China, at U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga. In this grove the tallest culms are 45 feet high but elsewhere heights up to 70 feet have been recorded.

but at least until a great freeze killed all the culms to the ground some years ago, the grove in the city cemetery was the most advanced in size of culms. I estimated some to be 48 feet high, with diameters of about $4\frac{3}{4}$ inches, in 1929. In 1942 a short basal section of an old culm at Anderson that had been frozen, measuring nearly 7 inches across at about 3 inches above the ground level, was brought to me. The diameter at a foot higher probably would be $6\frac{1}{2}$ inches. The height of such a culm probably would be at least 65 or 70 feet.

The large mature culms of the Moso bamboo, although not of nearly as high value for most industrial purposes as are those of certain other species, are produced and variously utilized in immense numbers in Japan. They are used as floats for giant fish nets, one of which nets may require a thousand culms. In China, paper pulp is made from the culms of this species. It seems to be generally conceded in Japan that commercial culture in order to be really successful must take into account both the young shoots for food and the mature culms for industrial uses. The commercial production in the late 1920's was reported to be around 110,000 pounds annually. In recent years extensive dying of the very young shoots of this bamboo in one or two situations in the United States has occurred, and the questions of cause and remedy are now under study by specialists. *P. edulis* (Carr.) Houzeau de Lehaie is known also as *P. pubescens* Mazel ex Houzeau de Lehaie, and there are some reasons to support the use of this latter name. The question hinges on whether the plant described by E. A. Carrière in 1866 was in fact the same as the one under consideration here, and I have believed that it was (see Journ. Wash. Acad. Sci. 27: 347-349, 1937). The invalid name "*P. mitis*"

was for a time applied to *P. edulis* through misidentification.

P. vivax McClure, shown on page 57, is a very vigorous giant bamboo from China that has recently produced culms up to 70 feet high at Mr. E. A. McIlhenny's place at Avery Island, La. The specific name, *vivax*, was given in allusion to the rapidity of development of new plantings under favorable conditions. In the lighter soils at the U. S. Barbour Lathrop Plant Introduction Garden, 45 feet is the greatest height reached as yet, though taller culms there are to be expected in the coming years. This species, only recently described and named (Wash. Acad. Sci. 35: 292-293, Sept. 15, 1945) is another one of the Frank N. Meyer introductions from Chekiang Province for the Department of Agriculture, in 1908, for which the detailed record is not quite clear. It now appears likely that it is one of the two very similar giant species collected near Tangsi, both of which were called *Tae tsoh*. The other almost certainly was *P. bambusoides* (to be treated next). One of these, the larger of the two—said to be the "second in size of the timber bamboos"—was reported by Mr. Meyer to grow in the valleys and at the foot of mountains, while the other, apparently only a little smaller as observed, grew on level land and in a more open stand. This latter apparent characteristic could be the result of thinning, I believe. This second species was said to be called also *Kang tsoh*. It is not possible at present to say which of these two bamboos, if either, *P. vivax* may represent, but the evidence seems strongly to indicate that it was one, and that *P. bambusoides*—collected at the same time but which did not survive—was the other.

Plants of this bamboo were placed with Mr. McIlhenny several years after the introduction was made and these



P. H. Dorsett

Phyllostachys bambusoides, the well-known hardy giant timber bamboo of which there are several mature groves in the mild-wintered parts of the United States. This is a view of the main grove at the U. S. Barbour Lathrop Plant Introduction Garden, about 12 miles southwest of Savannah, Ga., on the coastal highway, taken in 1921. Culms up to 72 feet have been produced here.

were the only ones of this species that survived. Happening to be planted in an unfavorable situation, it was many years before the species gave noticeable indication of its possibilities. It is closely allied to *P. bambusoides* and some of us held the view for some time that it probably was just a distinct variety of that species. Mr. McIlhenny's careful observations over a long period, however, convinced him that it was a quite different bamboo, and when a critical study of adequate vegetative specimen material was made by Dr. F. A. McClure, Mr. McIlhenny's judgment was fully confirmed.

The leaves of *P. vivax* are at first in 3's and 4's but the lower one drops late in the season, leaving 2 or 3. They are fairly broad for their length— $2\frac{1}{2}$ - $6\frac{1}{2}$ inches long by $\frac{1}{2}$ - $\frac{3}{8}$ inch wide—and are flat as contrasted with the slightly wavy leaves of *P. bambusoides*. The culm sheaths greatly resemble those of *P. bambusoides*, being darkish and fairly well covered with large spots, often ill defined, or diffuse, but they differ in the conspicuously crinkled condition of the sheath blade. Among less noticeable characters, the sheaths differ in the entire absence of any pubescence or marginal cilia. This completely glabrous character suggests the English common name "smooth-sheath bamboo," which I here propose. The smoothsheath bamboo, because of its large size and of its even greater vigor as compared with *P. bambusoides*, seems destined probably to become of first importance among the hardy giant timber bamboos. It is possible, however, that the tests of the physical properties of the wood that are in progress may compel some revision of this opinion. The young shoots are edible. *P. vivax* has been sent out by the Department of Agriculture in recent years as *Phyllostachys* sp., P. I. No. 82047.

P. bambusoides Sieb. & Zucc. a view of a grove of which is shown on page 59, is the most widely known and cultivated of the hardy giant bamboos in our southern and Pacific Coast states. It is a Chinese species but has been grown widely also in Japan for a very long time, and the early introductions of it into the United States, as well as into Europe, apparently all were from Japanese sources. The commonest Japanese name is Madake. In the United States the species has been called the "hardy giant timber bamboo," "giant timber bamboo," or simply "timber bamboo" for brevity. It has also been called "Japanese timber bamboo." With the recent observations concerning the somewhat similar, newly described, *P. vivax*, and, in addition, our knowledge of the large form of *P. sulphurea* var. *viridis*, it begins to seem questionable whether it is advisable to continue the use of such a general name as "giant timber bamboo" to designate any one of the three giant species that so closely resemble one another in a number of characters. All three of the species in question are hardy giant timber bamboos. I incline to the opinion that the short Japanese name, Madake, already widely known for *P. bambusoides*, will hereafter be found the most suitable common name for this species, wherever it may be grown outside of the Orient. The young shoots of Madake are of good quality for eating.

P. bambusoides thus far seems to hold the record for height among the hardy bamboos by a narrow margin, in this country, according to the present available information. It remains to be seen whether it will continue to hold it against *P. vivax*. A 1945 culm at the Barbour Lathrop Plant Introduction Garden grew 72 feet high. The diameter of such a culm is nearly $5\frac{1}{2}$ inches at a foot from the ground. Data



P. H. Dorsett

*Basal sections of large culms of *Phyllostachys bambusoides*, showing masses of the true roots. A section of rhizome from a bud of which the culm at the left originated and to which it is still attached is clearly seen. As is also evident, the culm section at the right is split to show the internal structure, including the diaphragms at the nodes.*

for comparison of the physical properties of the wood with those of the other two species alluded to above are not available as yet and it cannot be stated with any certainty, therefore, whether there are significant and important differences. It seems probable, however, in the light of past experience with *P. bambusoides* that its wood will not prove inferior in qualities that determine industrial value. The surmace of the internodes is of a beautiful glossy green, which becomes gradually duller and finally, after several years, grayish or yellowish green.

The leaves of *P. bambusoides* are usually 4 - 5 on a twig, one leaf falling late in the season, and are somewhat wavy. They differ in this respect from those of *P. vivax*, as well as from those of most other related species. In size of leaf there is little difference between these two species, though in some situations the leaves of *P. bambusoides* have seemed to average slightly broader for their length than those of *P. vivax*. The range in length of the mature leaves is from $2\frac{1}{2}$ to about $6\frac{1}{2}$ inches and in width from $\frac{1}{2}$ to $\frac{7}{8}$ inch or rarely 1 inch. The culm sheaths, like those of many other species, are variable in their markings, as well as in the shade of the ground color in the fresh state. In general the ground color on the lower sheaths is a dingy straw color, the higher sheaths gradually becoming a normal straw color, and the markings consist mostly of ill-defined and odd-shaped brownish spots and blotches, the blotches often predominating. There are usually no auricles and no bristles present on the lowest 6 or 7 sheaths on the culm but they develop conspicuously on the sheaths from about the 8th node upward. There are only a few scattered fine hairs on the surface of the sheath but the outer margin is distinctly ciliate.

There are several vernacular names besides Madake, as for example, Nigatake, reported from Japan for *P. bambusoides*, but it seems scarcely worth while to give others here. Two other scientific names that have been current for it in the past are *P. quilioi* and *P. reticulata*. The former is a straight synonym, but Dr. McClure has told me that he has such serious doubts that *Bambusa reticulata*, on which *P. reticulata* was based, was the plant we now know as *P. bambusoides* that on the basis of present evidence he is not willing to concede the identity of the two. (He has examined the type specimen of *B. reticulata*.)

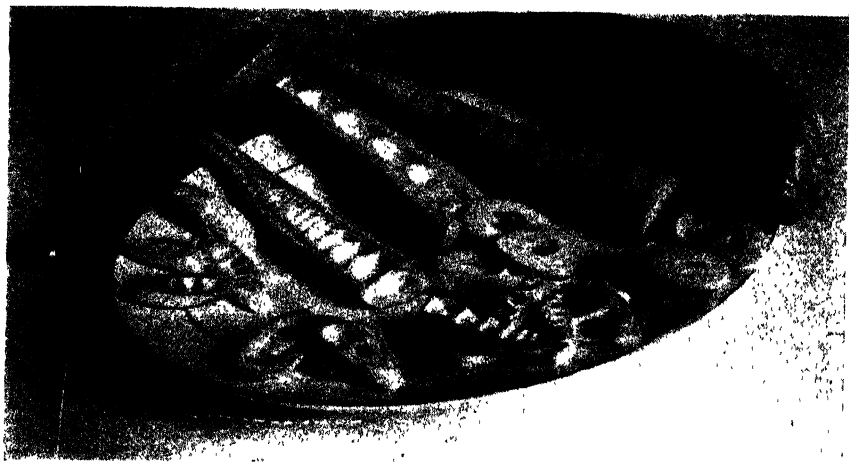
Before leaving the genus *Phyllostachys*, I think it is worth while to try to give the reader a little better idea, by means of a photograph, of the rhizome and root systems of the bamboos of this group, and an informative photograph taken many years ago by the late P. Howard Dorsett, with whom I had the pleasure of working for many years, is shown on another page. Also, as it is difficult to envision from words the magnificence of one of the larger bamboo culms as it stands in nature, a photograph taken a few years ago by Mr. John E. Cornwell, Allerton Farm, West Chester, Pa., looking directly upward from the base of one of these great culms of *P. bambusoides*, is reproduced, on page 63.

And finally, in order to give a visual impression of the edible bamboo shoot, there is included a photograph showing an entire shoot of *P. bambusoides* as it appears when dug from the ground, together with another shoot with sheaths and woody base removed, and parts of other shoots variously cut and in different stages of preparation for cooking. The texture of a proper shoot for eating is firm and crisp except that toward the base of the shoot the fibers which ultimately form wood



John E. Cormcull

*"Looking upward" from base of a giant culm of *Phyllostachys bambusoides*, at U. S. Plant Introduction Garden, near Savannah, Ga.*



R. L. Taylor

An entire edible shoot, with enclosing sheaths, of Phyllostachys bambusoides, with other shoots "peeled" and in various stages of being cut up for cooking—in differently shaped pieces.

are gradually further developed in that direction and the lowest part of the shoot is too woody to use. By cutting the moderately fibrous portion crosswise and not too thickly, so that the fibers are all cut into short lengths, and then cutting the slices further into other desired sizes and shapes, more of the fibrous portion of the shoots can be used with satisfaction in eating than if the pieces are cut lengthwise of the shoot. The shoots retain the crisp texture, even in the tenderest portions, when cooked. The shoots of most species of *Phyllostachys* other than *P. dulcis* have a more or less bitter taste when fresh, and it probably is best as a rule to parboil them for 6 to 8 minutes and then change the water. One change of water usually is sufficient, with a total cooking time of about 25 minutes. The taste or flavor can perhaps best be described by saying that it slightly resembles very young field corn; as one writer has suggested. Some earlier writers have compared edible bamboo

shoots to asparagus, for which there is not the slightest basis except that both products are cut when very young. The cooked shoots are satisfactorily served hot with butter and in meat stews, cold as a salad or in mixed salads, and in numerous other American, as well as oriental, dishes.

Correction

Attention is called to a correction made in the reprint of the first article in this series. On page 185, in the July, 1945, issue of the magazine, the name *Sasa palmata* (Mitf.) E. G. Camus was used tentatively. Too late for correction in the magazine, the conclusion was reached that the name would be written more correctly *S. palmata* [Burb.] E. G. Camus. The name *palmata* was first used for the plant by F. W. Burbidge, not by A. B. Freeman-Mitford as indicated by Camus in his publication of the new combination.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Some Dependable Plants for the Rock Garden

A well planned and planted rock garden or wall planting is a real achievement. It may be a thing of beauty, or if not given due thought it will develop into a mass of rocks, scantily covered with a few plants none of which will be growing well.

One may, however, with a little study of proper placement of the rocks with soil well rammed in between and around them, with interest in good plant material, with some perseverance in upkeep, possess the most worth while and valuable part of the ground surrounding a home, for a choice rock garden is a never failing source of pleasure.

A basic rule is to select plants for their foliage effect as well as charm of bloom, for there are times when all plants have a rest period. When they are out of bloom, however, if right choices are made the rock garden will present a good appearance throughout the entire season because the rocks are adorned with the foliage of interesting patterns and attractive green.

If one plans with this in mind, one soon learns that not all alpine plants are desirable. One needs to exercise a calm judgment as to what is most beautiful, most dependable for the places in which they are destined to find their new home.

We do not want the rock garden to present the garish color display the herbaceous border renders, rather we should strive for fine and delicate detail, remembering always that these are precious gems and should be planted

with a sense of fitness of material to the place in which it is to grow.

Too many rock gardens have a spotty appearance, due to the fact that the owner chooses too many varieties, often only one of a kind; thus we find no unity in design, just a heterogeneous collection. It is the nice balance of foliage and flower—plants of special interest and charm that repay dividends of satisfaction and the picture made is a real achievement.

Everyone ought to develop an interest in the native habitat of alpine plants. If one learns how and where they grow and gains some understanding of their simple likes and dislikes, he may more intelligently provide for them suitable places and conditions for healthy growth.

Undoubtedly two main points of alpine culture are *drainage* and *top-dressing*, and success depends on our attention to these.

Let us begin with the lovely *Aethionema*, not because they begin with the first letter in the alphabet, but because this genus of delightful plants present charming subjects for the rock garden. Their native home is on sun-baked soil therefore give them a sunny spot and since they are deep rooting, gritty limestone soil is to their liking. *Aethionema grandiflorum* grows about a foot high, is dependable, the pink blossoms are effective, and it can be used on the higher places to advantage. Lovelier still are the dwarfed ones—*armenum* and Warley Hybrids. These are more compact in their habit of growth, their neat small bushlets never more than four inches in height and each stem will carry a rounded head of pinky-

mauve flowers. Warley Hybrid is very like *armenum*. They are lovelier when grown in groups of three, and may be depended upon to bloom wonderfully well.

Epimediums are invaluable for shady corners of the rock garden, but will do fairly well in part sun. The flowers are daintily charming—myriads of tiny blossoms white and cream—sulphur yellow and some with various tones of lavender. But Epimediums are especially valuable because of the beauty of their foliage. The heart-shaped leaflets have lovely tints in early spring, light green during summer and again in autumn carry bronze tones. The plants grow to twelve inches in height and are always a delight to see, because of the character of their growth. The leaves are classic in design, are carried on slender stems, but stand upright in wind or storm. This is highly recommended for the choice rock garden, but strange to say is not often seen even among so-called good collections. Epimediums seldom set seed but may be propagated by division. In the writer's garden, the Epimedium planting draws appreciation from every visitor.

Erodium or Heron's Bill is closely related to the Geranium family, and is a valuable plant both for foliage and charm of bloom. They are grouped in several classes—some with silky foliage—some with leaves never silky—those wrapped with hoary green down—then those so-called hybrids.

Observing many plantings in England, the writer became an enthusiast, brought home seeds and from these a goodly batch grew and bloomed wonderfully. Many were lost, due to lack of perfect drainage, a lesson we all must learn if success is our aim. The Erodiums are so fairy-like in their character, that one is doubly repaid in any effort to grow them well, if one meets

with failure it is worth trying again, for they are easily raised from seed. *Erodium macradenum* has delicate green fern-like foliage with pink flowers with a spot of black at the base of the petals; it is unusual and intriguing. *Erodium corsicum* is just as lovely but since it comes from Corsica it needs some protection in winter. *E. guttatum* has white flowers and is a good little plant. *E. chrysanthum* is yellow flowered; thus this genus gives us a variation in color of flower. Give them a choice place, indeed a conspicuous spot for they have a long season of bloom, are only three to five inches high, and when out of bloom have foliage of interest and beauty. To see how far down among the rocks their roots will travel, shows us how very much they require drainage, for they will not stay with us long without it.

If we are charmed with Erodiums, then their cousins the Geraniums or Crane's Bill will prove equally intriguing, for the dwarf geraniums are considered by many to be the most charming of all rock plants, for they are exquisite in bloom and quite amenable to easy culture.

It is difficult to say which is best among the three choice varieties—*argenteum*, *cincereum*, *Lancastriense*.

Argenteum is called the silver-leaved Crane's Bill and since any glaucous green foliage always lends distinction to any plant, it gives this special charm and with its three inch high, saucer shaped pink blossoms with darker veins it is indescribably beautiful. *Cincereum* is much like *argenteum*, not quite as hoary and with flowers a little lighter in color.

Lancastriense is very choice. It is of prostrate growth; its branching stems close to the ground, carry many large saucer shaped flowers of a clear salmon pink delicately veined. To see it growing out of the rocks is a sight



Claude Hope

Autumn Blooming Cyclamen

[See page 70]

not soon forgotten. It presents a charm unbelievable. These present a real picture when planted in groups of three. Few plants of whatever genus can surpass these dwarf Geraniums in beauty and desirability.

The genus *Campanula* is known and grown by almost every owner of a rock garden, and rightly so since this family contains so many desirable and satisfying types of plant material. They might well be used as the main part of the picture, using other plants as accents. They are very amenable to good soil and reasonable care; there is enchantment about their bloom and foliage that make them really indispensable in any good rock garden.

First choice might be given to *C. muralis* or *portenschlagiana*, considered by many to be the finest of all rock garden campanulas. Easily grown, its glossy green foliage a joy always, and in bloom its violet cups grow in such profusion as to almost hide the foliage, and after blooming time is over its neat cushions of leaves is pleasing all through the summer indeed, into winter. One could be quite content with this enchanting charmer if no other alpine campanula existed, but there are many others to satisfy the desire for variety.

Campanula rotundifolia is the good and dependable Bluebell of Scotch ancestry, which should be in every rock garden for its dependability of bloom and growth. There is considerable variation therefore one should be watchful for good forms.

Purple Gem is one of the new hybrids of deep rich color and exceedingly prodigal of bloom, much more so than the ordinary form.

Campanula stenocodon is quite rare, said to be a hybrid of *rotundifolia*, but it bears no resemblance to the latter. for *stenocodon* has tube shaped narrow bells of violet, frail in its manner of

growth and just six inches in height. It is a lovely thing and any one having even one plant ought to feel a thrill. Mine bloomed wonderfully, and visitors came to see it, but it passed out probably due to too rich soil. These denizens of the mountains cannot thrive on rich food. Having learned, that it likes stony places in which to run its roots, my next try ought to result in success.

Campanula poscharskyana is a likeable plant, has the reputation of being somewhat invasive or rampant, but it is so easily lifted by sections and planted in another spot which needs its showy lavender blue star like blossoms, myriads of them like a blue fountain.

Garganica is another easy doer. It is charming as it fills every crevice and will follow the contour of the rocks in a most interesting pattern, always neat and compact. Surely its color has been taken from the fair Italian skies. It is a sun lover and is easily increased by division.

Carpatica is always a welcome friend when Spring calls forth its sleeping beauties. Isabel is one of the newer forms and Blue Carpet is but recently come out. Harvest Moon carries large flowers very flat, almost wheel-shaped and of fine color. *Carpatica pallida* gives us blooms of large size and light blue.

Slugs cause many casualties among Campanulas, indeed in one night a favorite plant may be destroyed. From an English gardener comes this advice: "Make a solution of Potassium Permanganate using one teaspoonful of crystals to one and one-half gallons of water. Water the surface around the plant with this solution letting it soak into the soil, this kills the slugs in the ground." Collars of wire or any rough materials help greatly in warding off these pests, but the Permanganate solution would simplify matters because



Malby

Campanula muralis

of its outright kill and the report states that the young shoots looked particularly healthy after the application, thus it is worthy of a trial.

Those who study and observe good plant material, soon develop a great appreciation for those creeping and trailing things which prove invaluable in clothing the rocks with their verdant carpets, among these we find Veronicas, Thymes, Dryas.

Of the Veronicas, we might well choose *V. rupestris* as the best. It is a very prostrate trailer, will cover a huge rock and creep down its side with the neatest and loveliest of dark green foliage, and in bloom is covered with tiny spires of rich blue blossoms, presenting a fascinating picture in May and June. Its foliage is as freshly green in summer and autumn as it is when it first awakens in spring. Nothing can be lovelier than this, and a rock or wall curtained with this blue charmer is a thrilling sight.

Veronica teucrium trehani is also desirable—having small yellow green leaves and fascinating amethyst blue spires.

Thymus Serpyllum has many hybrids of great value. *Coccineum* has minute leaves of very dark green forming a mat-like effect with the tiniest petals of intense crimson blossoms. This is certainly a choice and desirable creeper, it will not grow, however, as fast or cover as much surface as does *Serpyllum* or of *citridorus*. The latter, however, has value with its close mat of foliage and just to brush it in passing one enjoys the delightful lemon odor.

Lanuginosus is a dense fragrant creeper, with its tiny glaucous green leaves that seem to be cut out of velvet. This should be planted close to the edge of a rock so that as it grows it may have the dry and cool surface whereon it may be assured against dampness, for like all hairy or velvet

textured foliage they abhor dampness. All the Thymes delight in a sunny spot.

The Dryas (mountain avens) is not a large family. We have, however, two worthwhile varieties, namely *octopetala* and *Sundermanii*. *Octopetala* is neat and lovely, the leaves are small and dark green somewhat like tiny oak leaves. The flowers are wide open saucers of white with golden centers, carried singly on stems about four inches high. If happy it will spread over a foot or more across. The blossoms are followed by fluffy heads of seeds like *Anemone alpina*.

Sundermanii is a hybrid of *octopetala* with the same dense and dwarf foliage. It is easier to grow than the former and more charming since its blossoms are larger and creamy white. It is a plant of compelling charm. This family requires gritty soil and a well drained site. Large plants do not transplant easily, so thrifty young plants are best.

It is possible to have a bit of fairyland in the rock garden if the Alpine Cyclamen is given a choice place in semi-shade and well drained. We might well call it the food of the gods even as it was in early times referred to as the Bread of Sows. The family is not

large—the named varieties being quite similar in growth and bloom. They are so fairy-like they seem unreal. *Cyclamen europæum* is wonderfully charming, flowering in late summer and the bright pink flowers have a delightful scent.

Cyclamen neapolitanum comes to bloom in early September before the leaves appear. The flowers on three-inch stems are an exact counterpart of the large greenhouse type, except these are miniature. The delicate blossoms of orchid tint has a spot of crimson at the base of each segment. The leaves are ivy shaped are somewhat variable in size, are pointed and the fine green beautifully marbled. They may be depended upon to bloom freely when well established. The seed capsules are almost as intriguing as is the bloom, for these curl up like a tight cork-screw and when fully matured suddenly burst scattering seed. It is a slow process to grow Cyclamen from seed, so one is wise to start with good corns which are available from firms specializing in unusual seeds and bulbs.

IONE WATERS.

Cincinnati, Ohio.

Lily Notes

GEORGE L. SLATE, *Editor*

Raising Lilies From Seeds

The raising of lilies from seeds is an interesting and fascinating experience and as gardeners generally buy their lily bulbs instead of raising them from seeds, the production of a batch of seedling lilies may be regarded as somewhat of a horticultural achievement. Several advantages may be listed, of which the most important is

the freedom of the seedling plants from the virus troubles to which these beautiful plants are subject. The raiser of seedling lilies can have many lilies for a comparatively small sum if he is willing to devote some time and effort to the project. When seedlings are raised there is an opportunity to select only the best for the border, the poorer plants being discarded. The

variation in a colony of seedlings is always an interesting feature when lily growers are viewing the display. As successive generations of seedlings are produced in the environment of one's garden, it is reasonable to expect that there may be a gradual adaptation of the species to garden conditions, and possibly an elimination of plants inheriting susceptibility to some of the ailments of lilies.

The raising of lilies is not difficult, but does require considerable patience as the seedlings grow slowly and none bloom earlier than the second season when grown in the cold frame, while some of the slower species may not bloom until the fourth or fifth season after the seed is sown. When they are grown in cold frames under lath shades, the amount of care required each day is very little.

To raise lilies from seeds one must first obtain the seeds. Except for *Lilium regale*, *L. pumilum*, and *L. formosanum* lily seeds are not generally offered by seedhouses. A few lily specialists can supply additional species, but considerable searching and correspondence may be necessary before seeds of the rarer lilies can be obtained. In some cases it may be necessary to purchase bulbs and raise one's own seeds.

If the seed crop is to be produced at home the necessary pollination must not be left to chance, but should be done by hand. Lilies frequently fail to set seeds when self-pollinated. If these self-unfruitful plants are to produce seeds they must be pollinated with pollen from another clone of the same species. With lilies that are generally grown from seeds, every plant in a population is different and its pollen should cause seeds to set on other plants of the same species. Vegetatively propagated lilies, however, may all be of the same clone and the transfer

of pollen from one plant to another within the clone will not produce a seed crop. The Madonna lily rarely seeds in gardens since all plants are of the same clone. However, if one can get pollen from other clumps of this lily, especially from plants that appear different, or that were set many years earlier, or later, than those on which it is desired to produce seeds, these plants may well be of another clone and their pollen should function effectively in producing a seed crop. Pollen of the Salonika variety of *L. candidum* is very effective in producing a seed crop on the ordinary type of *L. candidum*.

The seed capsules of most lily species contain several hundred seeds so that not many capsules are needed to produce enough seeds for the average garden. Heavy seed crops may exhaust the plants and not more than two or three capsules should be allowed to develop on each plant.

The capsules are harvested when they begin to crack open and the seeds are shelled out. The later blooming species may not ripen their seeds before hard frosts, but the stems may be cut and placed in water in a warm place where the seeds will ripen up within a few weeks. When a greenhouse is available, the later lilies which fail to ripen seeds outdoors may be grown in pots inside to insure the ripening of the seeds.

Lilies may be raised from seeds by various methods and the choice of a method depends largely on personal preference and available equipment. A cold frame, lath shades and seed flats are essential but a greenhouse will provide a longer growing season for the seedlings. However, its lack should not deter any from raising seedling lilies.

Lilies may be divided into two groups according to the method of ger-

mination of the seeds. The seeds of the one year lilies germinate promptly the first year, send up a cotyledon, followed by a true leaf and continue growth throughout the season. Lilies germinating in this manner include *amabile*, *callosum*, *candidum*, *concolor*, *dauricum*, *Davidi*, *formosanum*, *Henryi*, *Leichtlinii* var. *Maximowiczii*, *longiflorum*, *regale*, *Sargentiae* and a few others.

The two year lilies also germinate the first year and make a tiny bulb which sends up no leaves the first year, but remains dormant until a year later when leaves appear. The tiny bulb requires a period of relatively low temperature to break the dormancy of the shoot and permit leaf growth. Normally this is brought about by leaving the seed flats outdoors over winter. Thus seeds planted in the spring of one year are left in the cold frame over winter and begin leaf growth the second spring. Where the winters are short and mild, lily seeds planted in the fall may germinate while the weather is still warm and later be subjected to enough cold to break the dormancy of the shoot, in which event they will make leaf growth the spring after fall planting. The winters in New York state are too long and cold for this to happen, so that fall planting of the two year lilies is not an advantage.

The two year lilies include the following: *auratum*, *canadense*, *chalconotum*, *Humboldtii*, *japonicum*, *Martagon*, *pyrenaicum*, *speciosum*, *superbum* and others.

The seeds of the first year lilies are planted in seed flats in the cold frame in early spring. Early planting is advisable as the seeds of some lily species, especially *L. candidum* and *L. Henryi*, germinate better at low temperatures. If convenient the seeds may be planted in late fall or during the

winter and the flats left in the cold frame.

The critical period with these lilies is from the time the cotyledons appear until the first true leaf is nicely started. During this period damping off may take place in rainy or cloudy weather or if the flats are watered too freely. The flats should be kept on the dry side and in wet weather the shades should be removed to promote aeration and drying of the soil surface. The use of finely pulverized sphagnum instead of soil for covering the seeds will tend to eliminate much of the damping off.

Watering should be done as needed and in the morning so that the foliage and surface of the soil will be dry before night. Weeds should be removed when small to prevent disturbing the lily seedlings.

The two year lilies are handled somewhat differently. Since they make no leaf growth the first year the seed flats are stacked up. The seeds germinate and form bulblets and these remain dormant throughout the first summer. The weed seeds germinate but in the darkness. About every three or four weeks the flats are taken down, watered and stacked again. In the late fall the flats are moved out to the cold frame. The following spring leaf growth appears and the care thereafter is the same as for the one year lilies. With this method the flats are carried through the first season with a minimum amount of care and they occupy no space in the cold frame.

Regular and thorough spraying with Bordeaux mixture 4-2-50 is advisable to control botrytis blight which in wet cloudy weather may often defoliate the young plants and severely check their growth. On the average the spray should be applied every two weeks, but in a dry season the intervals between

sprays may be lengthened. In wet cloudy weather weekly sprays may be necessary especially early in the season, and the shades should also be removed to permit aeration and more rapid drying of the foliage.

Another worthwhile practice is fertilizing the seed flats at intervals of a week or ten days during the growing season with chemical fertilizer dissolved in water. Plants receiving this stimulation grow much faster than unfertilized seedlings and may even bloom the second season if left in the seed flat. The fertilizer solution is prepared by dissolving a handful of a 5-10-5 fertilizer and a handful of sulphate of ammonia in three gallons of water. Each flat received about a pint or less of the solution and is then sprinkled with water to wash the solution from the foliage.

Seedlings of the one year lilies remain in the flat for two years while the two year lilies stay three or even four years with some of the slower growing species. Each winter the flats should be mulched to prevent frost action from heaving the little seedlings out of the soil. Covering the flats with fine mesh hardware cloth will keep them out.

When the seedlings are ready for removal to the nursery beds the soil is tipped out of the flats the bulbs picked out of the soil and planted out in rows. A planting depth of two to four inches and the bulbs six inches or less apart in rows eight to ten inches apart will give them enough room for the time they are to spend in the nursery. Mulching is advisable for

the first winter. Straw, marsh hay, or a similar material may be used where snow cover is uncertain. Evergreen branches may be used too for protection.

The seedlings will mostly bloom the second year in the nursery at which time the best may be selected for the garden. Vigor of plant and placement of flowers are important garden characteristics to consider in making selections. The two best plants may be crossed with each other to provide seeds for another lot of seedlings.

Seedling lilies may be raised by many other methods. The use of a greenhouse provides a longer growing season and consequently a larger bulb in a shorter time. The seedlings too may be pricked out into two inch pots where they may make better growth than when crowded in the flat.

The seeds may be planted directly in the soil of the cold frame instead of in flats. If the soil is sterilized with some material such as Larvacide which kills weed seeds as well as fungi, the labor of caring for the seedlings will be reduced to a minimum.

Open field culture is possible, but the watering will need close attention when droughts occur.

If basal rot is discovered on the little bulbs when they are tipped out of the flats they should be washed, the rotten tissue scraped out and the bulbs dusted with Arasan or Spergon. The *Martagons*, *candidum* and *chalcedonicum* are most likely to show basal rot.

GEORGE L. SLATE

Geneva, N. Y.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Dexter's Hybrid Rhododendrons

It is important that something be placed on record regarding a hybrid race of rhododendrons belonging to the Fortunei Series, raised and disseminated during the last twenty years by the late Mr. Charles O. Dexter of Sandwich, Mass. While the history and description here presented are not complete and further information will be required to fill all the gaps, the danger is ever present that certain vital facts will be lost or forgotten if such are not assembled while available. Since this group of plants and their progeny will be likely to occupy a permanent position in American horticulture, the subject is significant. At the present time, considerable numbers of Mr. Dexter's own production are in existence, but it is questionable how many of them will ultimately pass from sight, to be replaced, in the Northeast at least, by hardier forms derived from further crossing.

At present we can say only that these beautiful rhododendrons belong largely to the Fortunei Series. It is probable that several species belonging to that Series, plus others from outside, have had a part in their development. These may be *Rhododendron Fortunei*, *R. Griffithianum*, *R. decorum*, *R. discolor*, *R. Fargesii*, *R. calophytum* and possibly others. All of these come from China, or regions nearby. As time goes on, the admixture of other species will grow greater as plant breeders use more species to bring in color, hardiness and other characters. The Dexter plants themselves appear to represent mainly large-flowered species of *Fortunei* character probably crossed *inter*

se, but this is conjectural. Although Mr. Dexter worked outside this group, it is with the race resembling *R. Fortunei* and its close allies that his name will be associated and with which we shall concern ourselves here.

On the whole, these plants may be described as large and vigorous, fully equaling the Catawba and Maximum rhododendrons in height, although none are old enough to really give us these data. When growing vigorously they are tolerably hardy in protected spots as far north as Boston, but are strongly suspected of following the behavior of their progenitors of the Fortunei Series in disliking zero temperatures, and, if growth is slowed through unfavorable conditions or by maturity, they might quickly succumb to winter-killing. It may be too soon to speak with authority on this subject, but one would hesitate to recommend them for any sub-zero climate. But, despite this, they constitute the most important "break" of recent years among evergreen rhododendrons on the Atlantic seaboard.

The Dexter hybrids bloom about one week earlier than *Rhododendron carolinianum*, which ordinarily blooms about May 20th at New York City. Their flowers are very large, some measuring nearly five inches across, and are borne in loose trusses of about ten flowers, which is considerably less per truss than our Catawbas, but the trusses are large, due to flower size. Their shape is rather flaring, some distinctly lily-like, and their edges may be plain, wavy or frilled. Their colors range through light pink shades down to cream and white, the yellowish

creamy character of some being merged with pink and light rose to produce salmon and apricot shades which are very handsome. Although a few may produce bluish or purplish hues, or be tinged with pink or lilac in the bud which later fades to white, they are ordinarily quite free from any purplish or magenta cast. In other words, their colors appear quite clean. Many of them are delightfully fragrant, although this is a variable character and Mr. Dexter once told me that those having the more fragrance proved to be more tender. The quality of their fragrance varies somewhat, too. In a more delicate way, several have a fragrance resembling a gardenia, while others have the scent of nutmeg. They are reasonably floriferous, but are not so showy as some other sorts because of their delicate colors, and the blooms are very beautiful as individual specimens. A few seedlings have appeared in fairly bright rose color, but brilliancy is lacking and further development toward richer color is needed. At one time Mr. Dexter was enthusiastically concerned with crosses of "Brittania," a brilliant English hybrid, on his plants No. 8 and No. 9, and it is possible that the stronger of his colors came from this source. The flowers are generally without conspicuous dots or color patterns on the upper lobe, but are otherwise marked, frequently having blotches of dark rose in the throat and along the ribs of the corolla lobes, sometimes intermixed with definite yellowish tinges.

The charm of the Dexter hybrids lies in the color, size and fragrance of the individual flowers, of which too much in praise can not be said, but the plants as a whole are looser, less formal and more untidy in appearance than those of *Rhododendron catawbiense*. The leaves may be a bit larger and a shade lighter in color than those of the latter.

The flower trusses are apt to be flat-topped, although several have well-formed spherical trusses, but with less than half the number of flowers per truss that are found in typical Catawba or Maximum rhododendrons.

Seedling plants, produced by Mr. Dexter, are now growing at several places along the Atlantic coast and in the Pacific Northwest. One collection is at the New York Botanical Garden, others at the Arnold Arboretum and around Boston, while Mr. Samuel A. Everitt of Huntington, Long Island, has several hundred of Mr. Dexter's original seedlings under conditions almost approximate those on Cape Cod where the Dexter collection resides. I understand that a considerable quantity of Dexter seedlings are also in the University of Washington Arboretum at Seattle, Wash., while others exist elsewhere. Since they seem to be fairly typical, the data for this paper are taken from the plans in Mr. Everitt's collection.

The main origin of the Dexter hybrids starts certainly with a few plants acquired early in the 1920s, or thereabouts, from the one-time Cape Cod nursery of the R. & J. Farquhar Company, located at Osterville, Mass., a short distance from Mr. Dexter's home. When this nursery was discontinued, Mr. Dexter bought these rhododendron plants which came to him without name or record of origin. All appeared, however, to belong to the Fortunei Series. It is said that the late E. H. Wilson gave it as his opinion that one of them resembled *R. Griffithianum*. Whether any were named English hybrids, unknown in America, or merely chance seedlings remains to be determined and I am not competent to pass upon it.

Whatever the origin of these first plants, their number was soon augmented by seedlings which Mr. Dexter raised from them and to which he gave

pedigree numbers. It is thought that these first were from crosses made *inter se* among the originals. Now, it so happened that Mr. Dexter acquired unusual skill as a propagator of seedlings and was soon raising them by hundreds and thousands. Assisted by an unusually favorable climate, site and soil, plus an ingenious mind in devising new techniques, plus the ability to nurse young plants with complete sympathy and diligence, Mr. Dexter, by 1926, was growing rhododendrons with about twice the speed of any other grower along the Atlantic seaboard. This encouraged him to get seeds of exotic species from China and England, raise many of these to blooming size and use them in further crosses. As might be expected from seeds gathered among mixed collections, where bees transfer pollens promiscuously, the seeds Mr. Dexter acquired and raised were probably, in some cases at least, untrue to type. So it is further not certain just what went into the new strain, but we know that he got a great many interesting things.

Mr. Paul Frost, landscape architect, of Cambridge, Mass., had much to do with the ericaceous plants originally used on the Dexter estate, gathering rare sorts from many sources, including some of the Fortunei series which John Farquhar, prior to his death, had brought from England, presumably out of Robert Veitch's nursery at Exeter. It seems that these were the plants growing at Farquhar's Osterville nursery, among which Dr. E. H. Wilson distinguished *R. discolor* and *R. decorum*, which Mr. Dexter acquired and numbered. Mr. Frost recounts that Mr. Dexter wrote, as late as June 19, 1925, that he had ordered from Osterville "14-15 Fortunei" as well as many azaleas, to be delivered the following Autumn. But Mr. Dexter had been collecting with Mr. Frost's aid since

1922, from a dozen different sources, so we cannot be sure that the Farquhar plants were the only ones used as an original basis for his work. This, however, seems most likely, in the opinion of the writer who first visited Dexter's in 1927 and observed in the plants which Mr. Dexter said were of the Farquhar source most of the characteristics of the race as it now exists. In 1926 Mr. Dexter erected a small greenhouse and began hybridizing and propagating seedlings in quantity. Mr. Frost writes:

"By 1928 and 1929, because he very much accelerated the process of production, Mr. Dexter was setting out annually in his Woodland nursery rows ten thousand rhododendrons and azaleas. Wilson shared with him seeds from the Arboretum, to which more and more of his own hybrid crosses were added. . . . After my visit in 1930 to Millais, J. C. Williams and Edinburgh, came the great period of experimentation with scores of Himalayans in New England."

Mr. Frost says that "certainly a score or more" of the Farquhar plants formed the basis of his later hybridizing.

In his crossing, Mr. Dexter chose parent plants with certain ideals in mind, his more important objective being to produce improvements and extensions of the Fortunei Series. It should be noted that species which survived at Mr. Dexter's had previously been tried unsuccessfully at botanical gardens and arboreta throughout the Northeast. In my opinion the success of Mr. Dexter in growing them was due in part to his favorable Cape Cod site plus the vigorous state of growth in which they were kept. They were well fertilized in early spring and no dryness was allowed to check their summer growth. In such vigor they were able to withstand the cold climate

of Boston, although I understand that all are not successful there now. It is to be expected that as such plants grow older and their vigorous vegetative growth diminishes they may not remain so resistant to cold winter temperatures. I choose to be very conservative and assert that the hardiness of any of these Dexter seedlings has not yet been fully proven for sub-zero climates or exposed locations.

I shall describe the Dexter hybrids in discussing the rhododendrons growing in the garden of Mr. S. A. Everitt on Long Island, since the plants which he acquired from Mr. Dexter appear to be fairly typical.

The Everitt Rhododendron Dell

Webster's definition of "dell" is "a small retired valley." This seems to aptly describe the shelterbelt valley or ravine owned by M. Samuel A. Everitt on Long Island. This semi-wooded vale leads down to Huntington Bay and lies within a few hundred yards of salt water. The surrounding slopes, with their cover of tree-growth, mostly oak, protect the plants in the valley from all sweeping winds and furnish conditions of light semi-shade and considerable atmospheric moisture. Although the soil is somewhat light, favoring good drainage, the situation is neither exposed nor dry, and the proximity of a body of water tends to equalize temperatures in both summer and winter favoring freedom from extremes. In these respects, Mr. Everitt's garden resembles that of Mr. Dexter on Cape Cod, where similar conditions prevailed and where winter temperatures seldom went down to zero. Similar, too, is the plant sympathy displayed by the owners, who treated their plants to a perpetual mulch and adequate feeding. Obviously, these conditions are as good for growing rhododendrons as can be found in the East.

Being an amateur plantsman of more than professional skill, Mr. Everitt has made the most of this valley. Needless to say, rhododendrons and azaleas comprise the main interest. The brilliant *Rhododendron Kaempferi*, covered with unbelievable masses of azalea flowers in May, is seen to wonderful advantage against the wooded background and appears in many variations. The garden is spotted, too, with specimens of Ghent and Mollis hybrid azaleas, as well as many of the native American sorts. Along with these are quantities of evergreen rhododendrons, ranging from the hardy American species, through the Fortunei hybrids of Dexter and a number of half-hardy English hybrids to a collection of Chinese species, mainly of the larger and harder sorts.

It is with the rhododendrons of the Fortunei Series that Mr. Everitt's most interesting work has been done. Some years ago he acquired a few plants of the variety "Mrs. Charles Butler," a form of *R. Fortunei*. These had not proved thrifty in a nearby nursery under exposed conditions, but they developed beautifully in this sheltered garden. Thus encouraged, Mr. Everitt acquired seed-flats full of young plants raised by Mr. Dexter on Cape Cod. Growing these to maturity by methods similar to those of Mr. Dexter, Mr. Everitt soon had hundreds of the Dexter hybrids blooming in his valley, with others annually coming into first bloom. The older ones are now six to eight feet high. He also has specimens of some of Dexter's foundation stock, including Number 9, which has seldom been improved upon in any subsequent offspring.

This Number 9 of Dexter, one of the first seedlings from his original plants, combines a salmon-pink color and a delightful fragrance. It possesses a definite yellowish suffusion, and this

leads one to believe that it may have *Rhododendron campylocarpum* or some other yellow rhododendron as an ancestor. This is mostly speculative, however, as definite records are lacking, and I have observed that most "guesses" regarding the parentage of hybrid rhododendrons are far from correct. But in this case the character is known to be definitely heritable and appears in numerous offspring. One or two of these in the Everitt collection are almost white with delicate yellow tinges and are, in my estimation, about the best in the whole Dexter assortment. I believe that most of them will trace back to Number 9. It should be noted that this plant, and many others having fragrance and a yellow tinge, are good for seed-parents only, since they are pollen-sterile, having malformed, abortive or impotent stamens. Blooming early, before pollen of hardier sorts is available, this situation makes it difficult for a plant breeder to use them.

These Dexter hybrid rhododendrons offer immediate possibilities for the Pacific Northwest and other regions free from extremes of temperature. How they might do in the South is still questionable, as I do not know of their being tried there. But for the East and Northeast—in fact, for anywhere in America east of the Rockies—they must have further development in the direction of hardiness before they can be put to general use, except in favored sites. At Dexter's and at Everitt's they are in most favored surroundings.

Hybridization of the Fortunei Series with *Rhododendron catawbiense* or the Catawba hybrids can be expected to yield little of value if we are to accept past records which show disappointing results. But when, in 1927, the variety Mrs. Charles Butler was crossed with *R. maximum* by the writer, interesting results ensued. Recently, by using

special techniques, several hybrids between the Dexter plants and *R. maximum* have been obtained by us. While this is not expected to improve the appearance of the Dexter hybrids, it is hoped that it may be of considerable value to *R. maximum* and thus of value to the many American gardeners whose rhododendrons must be of the ironclad type. For, be it noted, no evergreen rhododendron species from abroad, except *R. Smirnovii* and a very few others, mostly unattractive, can even yet be regarded as reliably suited to the climate of New England, the North and the Middle Western United States.

Since the purpose of this article is mainly to discuss the Dexter Fortunei hybrid rhododendrons, other features of Mr. Everitt's rhododendron garden must be treated separately at some other time. But in passing, it might be well to mention a few noteworthy plants, first among which is *Rhododendron auriculatum*, which blooms on the first of August with large, white, lily-like flowers; and seedlings from *R. haematodes*, rather dwarfish, which are almost cherry-colored, something like the color of *R. Kaempferi*, but a bit darker and duller. There are quite a number of other Chinese species, mostly of the large types. Then there are some excellent plants of *R. keiskei*, a Triflorum from Japan with pale greenish-yellow flowers somewhat smaller than those on *R. carolinianum* but looser and more azalea-like. Anyone expecting a rich yellow color in these or in the large hybrid, "Goldsworth Yellow," also present, will be disappointed with these weak yellows. I prefer yellow azaleas. There are also a number of good English hybrids, not fully hardy elsewhere in the North, among which "Bagshot Ruby" and "Cynthia" are good reds, and "The Bride" is a superb white. There is a Maximum

hybrid in the collection, however, that probably merits wider usage in this country, and it is called "Mum." It blooms late and has large trusses of fine white flowers, twice the normal size of *R. maximum*, surmounted by a conspicuous bright yellow color pat-

tern on the upper lobe. While not so hardy as *maximum*, it may be all right. It was produced by J. Waterer in England and bears evidence of partial *R. ponticum* ancestry.

CLEMENT G. BOWERS

July 20, 1945

Narcissus Notes

B. Y. MORRISON, *Editor*

The section for Daffodil Notes is deliberately short this time, because it is the intent of the Editor to use it chiefly in an appeal to all members who are concerned with this flower to send in their own notes for the coming issues. The time to make daffodil notes is in flowering time and that will soon be upon us, even those of us who live in the most temperate sections of the country.

It is hoped that we can gather enough material this Spring season to warrant the printing of another Daffodil Yearbook, and that will depend very largely upon what each one of us does this Spring. Even if last year's planting was limited, there are always notes to be taken on the old and familiar varieties.

We have daffodil fanciers and amateurs in every part of the country. There should be no dearth of interest or of material. If you have a show, a report of the show will be welcome. If you are a beginner, let us hear what has done well and what has not. If you have violent prejudices, air them. If you are firm in your admirations do not fail to report. If you are raising seed-

lings, tell us about it. If you are a collector, tell us the basis of your collecting. If you live far to the North or South, that will give interest also. This is for you personally.

Narcissus, Forfar (See page 80)

This very beautiful flower was introduced many years ago, but is not much in trade in this country perhaps only because no one has boomed it. It is late-midseason in opening its blooms and none-the-less suffers not at all in comparison with the many colored flowers of that time.

The very symmetrical perianth segments are nearly white with no stain at the base near the cup. This is small, fluted, and a deep orange yellow overlaid from the margin with deep red orange. If the flowers are picked in bud, there is more of this color. Those in the photograph were gathered out of doors and were not given any treatment "for showing." They had only the usual overnight drink of water in a deep pail set in a cool place.

The variety multiplies well and has as much vigor as the "standbys" so that it should be popular everywhere.



Robert L. Taylor

Narcissus, Forfar

[See page 79]

Cactus and Succulents

WILLIAM G. MARSHALL, *Editor*

Christmas Cactus

Very few of the 1,600 or more species of cacti are known by a common name. The Christmas Cactus is an exception of almost universal use though botanists disagree as to its proper scientific name, some calling it *Zygocactus truncatus* while others, especially in Europe, call it *Epiphyllum truncatum*.

The name Christmas Cactus is appropriate because this species bears its numerous, colorful flowers from October to January, with the heaviest crop just around Christmas time.

Zygocactus truncatus is native to the mountains in the State of Rio de Janeiro, Brazil, where it is epiphytic on forest trees or lives on shaded shelves of cliffs, in either case living on humus deposited in tree crotches or rock interstices and on the tropical rains of almost daily occurrence.

The terminal branches are thin, leaf-like, glossy-green joints about 2 inches long by 1 inch or more in width and with 2 or 4 acute teeth on each side of the truncate terminal end, a shape which strongly suggests a crab and has caused the plant to be called the Crab Cactus by some. The 2½ to 3 inch, zygomorphic flowers arise from the terminal joints, are of various colors and last about 15 days.

As the branches age they thicken into elliptical, jointed branches covered with brownish bark but never become firm enough to hold the terminal branches erect, for which reason the plant lends itself to hanging basket culture.

As soon as the flowering season is over, usually in late January, the plant

goes into a rest period which lasts from 4 to 6 weeks during which time the stems droop and the terminal joints become flaccid, and some of them may fall off. At this time watering should be reduced to the minimum to prevent the soil from becoming too hard. One light watering each second week should suffice.

When the plant shows signs of renewed activity more water can be applied and the entire plant should be syringed daily. Liquid fertilizer or any complete plant food should be used several times during this period which lasts from about early March to mid-September and the plant should be moved outdoors into a light but shady place as abundant fresh air is needed for free flowering.

From mid-September reduce the water supply to a light application weekly and bring plants indoors where they can be free from drafts and sudden temperature changes. When buds appear again increase the water supplied to each second day but omit syringing and do not move or jar the plant. These directions should produce a heavy crop of flowers.

Each commercial grower has his own soil mixture for Christmas Cactus but a mixture of equal parts of top soil, sharp sand and well aged leaf-mold with one teacup of well rotted cow manure to each gallon of the mixture has proved very satisfactory. If liquid fertilizer or complete plant foods are added each summer as suggested, repotting will be unnecessary for four to five years.

Zygocactus truncatus has a pink to deep red or claret colored flower.



Christmas cactus

Z. truncatus var. *delicatus* has a more slightly larger flower, carmine scarlet or brick-red or carmine in color. *u. truncatus* var. *delicatus* has a more erect growth habit, with narrower, longer joints and bears flowers of a delicate flesh color. *Z. truncatus* var. *crenatus*, also listed as var. *violaceum* has 2 to 4 teeth that are rounded not

acute as in the species, and a smaller, bluish-violet flower.

In addition to these varieties about 60 hybrids are offered of which the following list is recommended by Britton and Rose in *Cactaceae* IV:178 who quote from Nicholson *Dict. Gard.* 1:517.:-

"*Bicolor*, white, edged with rose; *coccineum*, rich deep scarlet; *elegans*, bright orange-red, center rich purple; *melanificum*, flowers large, white, tips bright rose colored; *Ruckerianum*, deep reddish purple, with a rich violet center; *salmonum*, reddish-salmon; *spectabile*, white, with delicate purple margin; *violaceum superbum*, pure white, rich deep purple edges."

Cacti

For more than four years I have found great pleasure in observing different species of cacti thrive under what little skill I may possess in caring for them. It gave me a great thrill to know that these spiny, fleshy little plants were dependent upon me. After experimenting with different varieties I became more acquainted with their characteristics and requirements, namely how often they should be watered, what the proper amount of sunshine is, and the similarity between different types of a specific variety. Soon I discovered that the "Cotton Cactus" like the "Old Man" needs very little moisture while the "Christmas Cactus" and the "Orchid Cacti" grew vigorously when frequently watered. This proved very helpful when making cactus gardens for in order to be successful you must have knowledge of the plants' characteristics so that you can select varieties with similar requirements. Otherwise one portion of your cactus garden should thrive while the rest would either rot or dry up.

My favorite cactus plant is one of the smallest that I have, and after ob-

serving it for more than two years, I have yet to discover what variety it is. Having a diameter of about an inch and being only one-eighth of an inch tall with long silky gray hair offset by miniature black spines, I really enjoy caring for it.

These are but a few of the many examples of pleasure in indoor gardening. Unless you have actually had experience in this field, you can't know what enjoyment there is in it. I suggest that you try it and see.

CARL VLASAK

Cleveland, Ohio

Some Small Decorative Agaves

Agaves or Century Plants are quite well known and familiar to most as quite large plants with towering inflorescences, as in the case of the most popular Century Plant, *Agave americana*, L.

However, there are a large number of species which might be classed as small plants, attaining a size at maturity of from 6 to 24 inches in diameter and more suitable for the smaller garden or collection. Included among them are some of the most decorative forms, those which have white markings on the leaves and in addition may have thready leaves due to the shredding of the leaf margins. It might be mentioned here that the white markings are due to the adherence of cuticle when the leaves separate or split apart from the tightly compressed central bud and varies in degree on different Agaves.

Agave Victoriae Reginae, Moore probably tops them all as most prized and decorative, almost perfect in its symmetry and also handsomely marked. *Agave Ferdinandi Regis*, Berger somewhat resembles the first named, but is a stouter and looser appearing plant. *Agave parviflora*,

Torr. is the smallest of the Agaves found, growing within this country, seldom exceeding 6 inches in diameter, a pretty little plant. It is somewhat surprising to be able to look down at the flowers of an Agave, but the inflorescence of *Agave parviflora* averages about 4 feet in height in cultivation. Often confused with the foregoing is *Agave Tounmeyana*, Trel. a plant which may exceed 12 inches in diameter. Another well known Agave is *Agave filifera*, Salm Dyck and its several forms, the most common of which is the variety *filamentosa*, the names in this case referring to the filiferous or thready margins.

Of easy culture and noted for their longevity many Agaves are well worth while, either as pot plants or planted outdoors where climate will permit this.

California

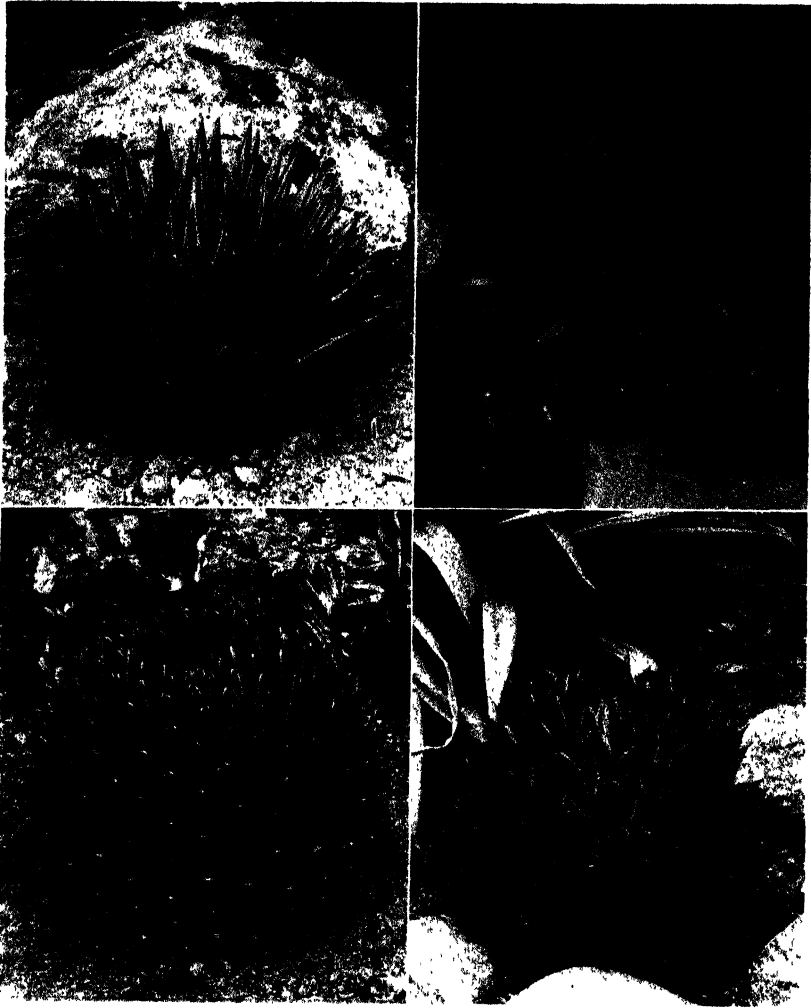
J. R. BROWN

Succulents in Canada

The Abitibi country of northern Quebec, particularly around Amos, is a treeless plain, coldly barren, where winter temperatures hover below zero and July nights may frequently be as cold as thirty above. It is not, therefore, a location in which one would expect to find species of tropical cacti or even the species of succulents from the sunny mountains of Mexico or Peru.

Seven years ago M. Laval Goulet an attorney of Amos became interested in succulent plants through a magazine article which described them and, despite the natural disadvantages of climate, he determined to own a collection of the unique plants and to see for himself the large and beautiful flowers of which he read.

A small glass house was built and a heating system installed with a thermostatic arrangement which rings a bell in his bed room when tempera-



Upper left, *Agave filifera*; upper right, *A. Toumeyana*, and below it *A. parviflora*. Lower right, *A. Victoriae-Reginae*; lower right, *A. Ferdinandi-Regis*.

tures drop to a dangerous low. Plants of many species of cacti and the other succulents were imported and books dealing with their culture purchased and studied. Through the medium of a magazine M. Goulet was put in touch with other collectors in Canada and the United States and from them he

solicited information to meet his peculiar conditions.

Results at first were not too promising but he profited by the loss of a few of his first plants, analyzing the cause of their demise and inventing methods to counteract further losses. Special soils and watering periods were



The Goulet Collection

worked out to suit his unusual growing conditions and today M. Goulet has a fine collection of well grown, fast growing plants which produce numerous flowers for his enjoyment. Needless to say visitors to his glass house are numerous and enthusiastic.

In the photograph M. and Madam Goulet are shown with a portion of the collection with the glass house and furnace room in the background. Immediately in front of them are a few of the tropical, epiphytic types of cacti and M. Goulet points to a plant of *Hylocereus* which has made exceptional growth for him.

The three hairy, columnar plants in the left foreground are, from left to right: *Cleistocactus Straussii*, the silver torch cactus, *Cephalocereus senilis*, the old man and *Oreocereus Celsianus*, the old man of the Andes. Species of *Echinopsis*, the Easter lily cactus can be noted in two of the flats

and the potted species in the middle ground are *Mammillarias*, *Echinopsis*, *Gymnocalyciums*, *Parodias* and *Notocacti*.

In the right foreground a species of *Stapelia* unfolds its star-like six inch flower, deep brownish red in color, this flower is best enjoyed from a distance as its fragrance is not inviting. It is a very interesting flower of complex structure and leathery texture covered by sensitive whitish hairs

Echinocereus Delaetii

When a very attractive plant proves difficult of culture it becomes necessary to find out the conditions under which it survives in its natural habitat. From the following excerpt from a letter from Mexico conclusions can be drawn as to the cultural requirements of the beautiful, but difficult *Echinocereus Delaetii*:

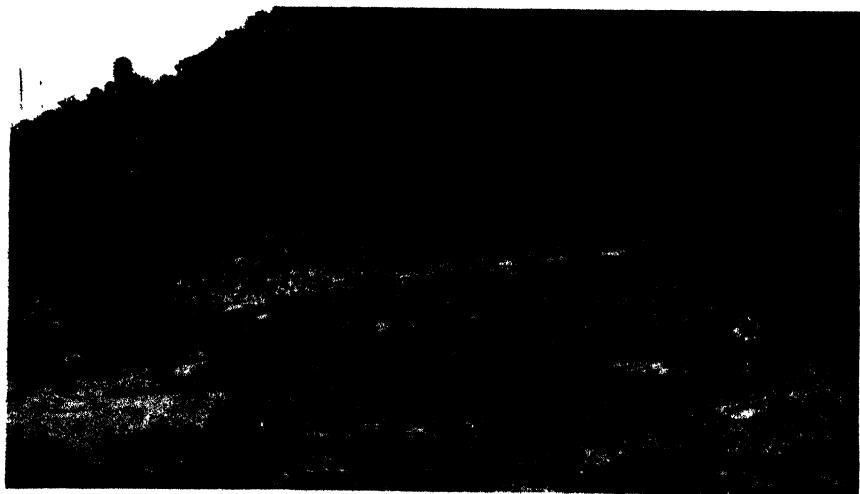
"Last Sunday, July 9th I made another trip in search of *Echinocereus*



Delaetii, and I'm happy to say it was a success. I have felt all along that my stay in Mexico would not be a success unless I saw this species in its native habitat.

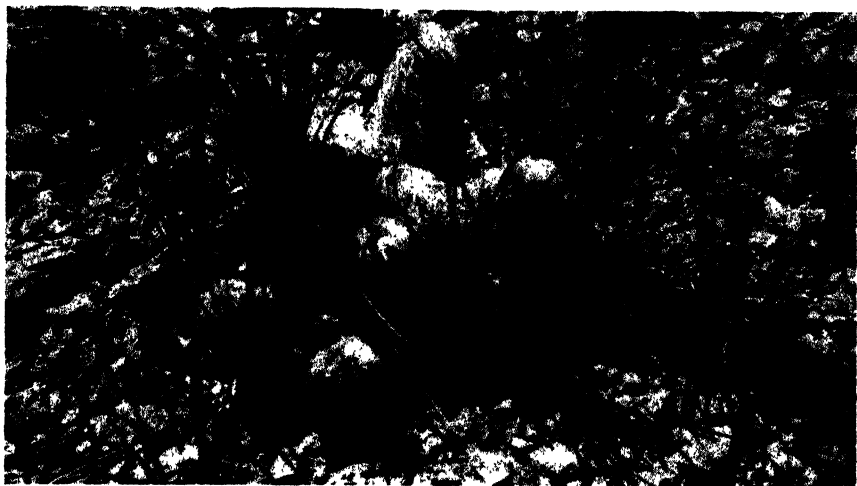
I took the highway to Torreon, Coahuila, and about 37 miles from Saltillo left the highway at what is called El Pilar. From there I travelled forty miles over just passible desert road and came upon a guayule camp. I inquired of the natives if they knew of a plant such as I described. They did, so I hired one, Jesus Mata, to guide me. It's a good thing I did because it would have been an unsuccessful trip other wise. We then travelled 8 miles to where the road ended. From there it was a one and three quarter mile hike straight up.

Photo number 1 was taken near the summit, showing the trail and the valley below, which is known as Valle Seco or Dry Valley. It was necessary to cross over the summit to get to the plants. They were growing on the



Photographs 1 (upper), 2 (lower) see page 87

Echinocereus Delaetii country



No. 3, *Echinocereus Delaetii*; No. 4, the party.

slopes on the other side, the exposure being southeast. The soil here was dark colored sandy loam, quite different from the slope we climbed to get there.

Photo number 2 is a view of the mountain where the plants grew. It was quite heavily covered with vegetation for this part of the country. Such plants as Yuccas, Agaves, sotol,

numerous grasses and shrubs were growing in profusion. One of the commonest plants was a species of wild onion which the natives eat. It can be seen in photo. number 3 growing up through the plant of *Echinocereus Delaetii*. There were a number of other genera of cacti growing here also, Mammillarias, Neolloydias, Coryphanthas, Escobarias and several

Opuntias. The combined other cacti were much more numerous than the *Echinocereus*.

Photo number 4 is of my companions, I never learned the name of the boy to the left. The other two from left to right are Jesus Mata and Joaquin Aviete. Don Jesus was delighted to pose, after I said I would send him a copy. He resembles Pancho Villa in the picture. He and the boy have bunches of an herb, which they use as a substitute for coffee. The

bundle they are carrying contains two plants of *Echinocereus Delaetii*.

All in all I was well satisfied with the outcome of the trip. It wasn't what I consider a rough trip; however it may be as I am used to such by now. I've fairly well covered 10 states, and mostly no highways, in the past 15 months I have been down here. One of my big regrets has been not to have another cactophile to travel with, but probably in that case I might have forgotten my work.

ROBERT FORES.

A Book or Two

Asparagus Production. Homer C. Thompson. Orange Judd Publishing Co., Inc., New York. 124 pages, illustrated. \$1.25.

A small practical handbook type of publication, written with the express purpose of bringing together the results of all recent research as published in state and federal bulletins as well as technical papers. There are fifty reference citations given in full, at the end of the book.

The Field Seed Industry in the United States. Frank Victor Buck. University of Wisconsin Press, Madison. 1944. 230 pages, illustrated. \$3.00.

Most of the members of this Society may not have a vital first hand interest in the Field Seed Industry, but none could fail to find an interest in this very lucid presentation which touches upon the early history of the production of this type of seed in the States, and the later development and growth of the industry during the period before and through the Second World War.

It is not a book which deals with the business of seed production and no

one will find advice as to how he might enter it and produce seed. It is a discussion of the industry and is limited to the more common grass and legume seeds that go into the common practices of pasturage, hay production, soil improvement and of course the inevitable soil conservation.

Practical Camellia Culture. Robt. J. Halliday. Lithographic reprint, by permission of the original edition (1880); arranged by Robt. O. Rubel, Jr., Crichton, Ala., 1945. 142 pages, illustrated; paper \$2.00; cloth \$3.00.

Many factors have contributed to the present insistent interest in the camellia, which is no new-comer in the country, which need not be discussed here, but there is no question that camellia growers, amateur and professional, successful or less so, do not always see eye to eye, either on cultural practices or in matters of taste, that perilous human arbiter of fashions in the perception of beauty.

This small old-fashioned volume, long out of print, is a usual manual, written from the point of view of the person who lived beyond the area

where the camellia is hardy and who first operated in that period when greenhouse construction was leaving the old stages to come toward the modern house.

If in the near future, more amateurs want glass houses of their own, some of them may find less interest in the highly heated type of house that has been evolved for the winter production of summer growing things and more in the relatively cool house in which so many plants "nearly hardy" can be kept safely and happily.

This volume may concern not only the camellia grower but others. Just how much it or any other reprint will do for the amateur will depend on the amateur; but certainly in this he will find, boldly set forth, a wealth of practical detail for the conditions described.

Horticulture and Horticulturists in Early Texas. Samuel Wood Geiser. University Press in Dallas, Southern Methodist University, Dallas, 1945. 100 pages.

The author, who makes many generous acknowledgments in his Introduction, states definitely what he hopes his book may be and to what it may lead. One can only admire the methods and procedures.

As can be expected, the volume will be of more interest to Texans than to others; and to the historically minded rather than the amateur gardener. The portions that could be and are presented in running prose are good reading; the portions that are statistical remain just that.

For the ordinary gardener, a reading of the text, and particularly the section devoted to the biographical notes, should be an inspiration, since it gives a stupendous amount of evidence that the amateur has given a great wealth of useful material from his own gardening. He, the present

day reader, may even be persuaded that his garden, his own small plot, may be the scene of horticultural endeavor of significance rather than just the scene of his personal satisfactions.

Monography of the Genus Camellia.

The Abbe Lorenzo Berlese. Reprint of the 1938 Translation by Henry A. S. Dearborn. Published by Joseph Brech & Co., Boston, 1938. 110 pages.

New Iconography of the Camellia.

Alexander Verschaffelt. 1848-1860. New translation by E. A. McIlhenny of the texts. 318 pages. Privately printed: E. A. McIlhenny, Avery Island, La.

These two European works, almost completely unavailable, now have been prepared and published by Mr. McIlhenny, who has for many years been a student and collector of the camellia.

The present day amateur, and most particularly those amateurs who may have to labor in the always hazardous field of the study of varieties remaining in cultivation in our South and Pacific Coast, owe Mr. McIlhenny a particular debt. Their task is and probably always will be a thankless and difficult one, with a "percentage of error" for which there may be no statistical salvation!

The Berlese text has a considerable part on cultural practices; the Verschaffelt text a brief treatment by Auguste van Geert, another notable horticulturist of that time.

To the person who knows nothing of camellias and who can't even have them, all this will be very dull going; to the amateur who is not vitally concerned, it will be interesting only in so far as he is historically minded; to the serious worker, however opinionated he may be, the two volumes are musts!

The Rhododendron Yearbook for 1945.

Published by The American Rhododendron Society, Portland, Ore.
 Edited for the Society by Dean Collins. 144 pages, illustrated: for members.

The American Rhododendron Society in its first volume reflects chiefly the activities of a small group of people in Washington and Oregon, who, quite aside from being excellent gardeners, have a climate or climates that are to the liking of the species of rhododendrons that the British gardeners have known and grown for years, and for the hybrids that have been evolved from certain groups of these species.

All the papers are of great interest but by and large are texts to sadden those of us who live beyond that "misty-moisty" and not too arduous realm. Mr. Seevers alone speaks for the "less favored" areas.

The book is ambitiously set up, but the illustrations leave much to be desired. As we move away from the war years this undoubtedly will improve.

If you are a collector of rhododendron books, you should have this, no matter where you live; if you are not a Pacific-Northwester and want only what concerns you, you needn't bother; but if you support horticulture, you should give it your support.

Cinchona in Java. Norman Taylor.

Greenberg, Publisher, New York, 1945. 87 pages, illustrated. \$2.50.

This is a rather slender book, scarcely more than a novelette, and can be read as quickly. In it there is much that has nothing whatever to do with "Cinchona in Java" save to give the setting, and the "motif" for the setting might well be stated as Dutch astuteness. Thanks to them, the cultivation of cinchona and the resulting commercial production were saved.

The skills that were developed in Java, and which fathered the practices that have proven so lucrative, are sound. Fortunately they are not exclusive, but they may remain exclusive and unique if the amazing industry of the Dutch producer and the skill of the Dutch merchant princes are not paralleled.

The book is written for the lay reader, not for the technical man, though the latter will recognize the salient matter. It cannot be used as a "how-to-do-it" book except by those who almost know anyway. The style is easy and pleasant and if one were to quibble at all, it would merely be that there are too many flat assertions!

Plant life of the Pacific World. Elmer D. Merrill. The Macmillan Company, New York, 1945. 295 pages, illustrated. \$3.50.

Among the things that have come to us as a people from our participation in World War II has been the projection of many individuals into geographic regions which had been as far distant from their former private lives as any star. To those who went, much happened besides the physical and emotional stresses of each period; to those who remained, there has been always an undercurrent of anxiety more or less active, more or less personal, about that new life into which "our" man or woman was projected.

To the gardener, here and now, Dr. Merrill's work, written from the richness of his long and careful experience and study in the Pacific world, in the present volume, will evoke a safer and sounder image of the plant world in which our forces moved and lived. It opens to the reader enough to remove that primitive fear that we all have of the unknown.

Of the plant life itself and its possible impact upon our gardens here, not

much can be said. The knowing gardener will recognize some names throughout; the gardeners from favored areas, frost free though drought or hurricane ridden, may recognize species now introduced, not only here but elsewhere, for they, like many other tropical plants, have their part in the circle of distribution, usually man-directed, about the globe.

Whether you care or not from the basis of your own private or garden life, you will find the book good reading, and if you like good reading, as all intelligent gardeners do, you will find citations to other works which may provoke your future visits to the library in search of new titles and new vistas into worlds new for you.

Trees, Shrubs and Vines, for the Northeastern United States. George Graves. The Oxford University Press, New York, 1945. 267 pages, illustrated.

This is published under the auspices of the Massachusetts Horticultural Society and is a most valuable manual.

It is pocket size and well organized. The Introduction tells exactly what the author intends doing and how he set about it. It also states the manner in which the book is to be used.

The major portion of the book is given over to brief descriptions of plant material, beginning with *Abelia* and closing with *Zenobia*. There are relatively few illustrations but they are excellent. The text which must have cost the author many an hour of travail in deciding what to say and what to leave out, is very concise without ever becoming dull. It has the further grace of not being dogmatic, even when the opinion is most firmly set forth. It is singularly free of "gush."

The balance of the work is given over to lists with brief texts, and a few useful chapters, on care and maintenance.

There is no definition of what the author means by Northeastern United States, and there are included a few plants that would hardly seem to warrant inclusion in the area which the reviewer would call that area. The comments on hardiness under various plants are much to be commended.

The Gardeners Pocketbook

Pinguicula vulgaris (Butterwort)— An Insectivorous Plant

The little flowers of the Butterwort Family are known over a wide range. They are found among moist rocks or the edges of gravelly streams in Europe, Asia, North America and along the Andes to Patagonia. The one illustrated was flowering in Alaska but the flower is known sometimes as the Labrador Violet, showing that it is of wide distribution. It is found among the mountains at the lower altitudes. Another common name is the Bog Violet.

The Butterworts are among the insectivorous plants, coming between the type which hold insects by sticky hairs, such as the *Droseras* or Sundews and the *Dionaeas* or Venus Flytraps, which close their hinged leaves upon their victims. The Butterworts attract insects by the sticky surface of their leaves but the leaves then roll up, enclosing the unwary visitor.

Pinguicula vulgaris is a small stemless perennial with basal entire leaves, the upper surface covered with a sticky secretion on which insects are caught. The leaves are pale yellowish-green, 3-7 in a rosette, greasy to the touch, 1-2 inches long, $\frac{1}{4}$ inch wide. The flowers grow on scapes 1-5 inches high and are bright blue, rarely purple, with a darker throat, lined with silky hairs. They are 2-lipped, the upper lip 2-lobed, the lower 3-lobed, larger, the tube gradually contracted into an obtuse or acute, nearly straight spur, $\frac{1}{8}$ inch long.

Occasionally grown among moist rocks or in bogs in gardens, where they are propagated by seeds or offsets.

The leaves of *Pinguicula* contain vegetable rennet and Linnaeus says that the leaves of *Pinguicula vulgaris*

were used by the Lapland tribes for curdling milk. The same custom is said to prevail among the peasants of the Italian Alps. Ada White Sharpless says, in "Alaska Wild Flowers," that "leaves disappear in winter and beneath the snow a fat nodule of greenish scales remains underground like a pseudo-bulb."

SARAH V. COOMBS.

Scarsdale, N. Y.

From the Midwest Horticultural Society

Flowering Peach

Perhaps the most brilliant colors of all flowering trees are on the flowering peach. While some nurseries offer by named variety, most list by color. Usually three colors are listed: white, rose pink, and bright red.

The flowers are double and resemble those of a flowering cherry. The foliage and growth habits are identical with the ordinary peach. The plant is rapid growing and prefers a well drained soil. The flowers appear in early spring before the leaves.

Like the other peaches the flowering forms grow into fair sized trees and are not especially long lived. They may also suffer occasional winter damage. In spite of these objections there is a fine landscape value in them, and the initial cost is usually low. Their use would be restricted to larger gardens and country homes.

During the latter part of April there would be a magnificent show particularly as the colors are sharp and clear.

Flowering Quince

The flowering quince is one of the old fashioned plants that has not retained as much of its popularity as de-



Marcine Williams

Pinguicula vulgaris

[See page 92]

served. Perhaps this is due to the slow growth of the plant and to the attacks of rabbits who seem to prefer the stems of young plants. However there is some indication that the plant will make a comeback as newer varieties have been produced with different colors, and some with dwarf habit. Colors available range from deep rich red through several pinks into pure white. Single and double forms are available for most of them.

The flowers are a good size and produced in the North before the foliage in earliest spring. The foliage is dark green, glossy and quite attractive. The stems are dark skinned, shiny, with a few thorns. The bush normally is erect to spreading. Dwarf forms are rounder and compact.

Ordinary soil and an open position are all that is required. This is one of the most admired shrubs when seen in early spring but is not too common in many gardens. Possibly some of this lack of small and medium specimens may be traced to the stupid attempt to call this firebush and cataloging it as such by some firms.

Rarely a hedge can be seen of this, while losing some of the flowers in the inevitable trimming the effect is still good when in bloom and as a different and attractive hedge it is very good.

Some thoughts on Cemeteries

One of the earliest of the park-like cemeteries in this vicinity is Mt. Greenwood located on the southwest edge of Chicago. This cemetery is now some seventy or more years old and was laid out on a series of low sand hills covered with a stand of white, bur, black, and red oaks and an undergrowth of crabs, hawthorns, and wild blackberry. Into this setting has been introduced attractive winding drives and many plants to supplement the natural beauty of the spot.

Evergreens had not reached the popularity in the early days of this cemetery that they now enjoy and consequently there is not the abundance of them in the landscape plantings as found elsewhere. Rather offsetting the lack of variety in mature evergreens is a magnificent grove of white pine near the entrance. Even closer to the gate is a fine clump of white birch. The birch is found distributed throughout the older plantings of the grounds and is especially attractive among the dark stems of the oaks. There are several groups of flowering dogwood distributed about the grounds. In the western portion of the older plantings are found many excellent specimens of the weeping elm. The stiff umbrella crown of these gives an artistic touch in the landscape that is excellent. In this same general area is a clump of Kentucky coffee tree on a point between drives. In the center along a drive is a good specimen of Sweetgum. Here and there are specimens of English oak, Norway maples, elms, Chinese elms and many of the common shrubs have been used freely. On the lots and apparently planted by the owners are such different things as European filbert, dwarf ninebark, several varieties of dwarf and low growing junipers, spreading and columnar yews, forms of arbor vitae, and many other relatively common species.

About a half mile from Mount Greenwood and lying on the same line of small sand dunes is Mount Hope which is somewhat newer dating back only to 1885. This cemetery shows the influence of evergreens very strongly. There are many excellent groups of Scots Pine, white pine, and large specimens of Mugo pine. The Mugo pine is especially interesting as most of them are about ten or more feet high and equally broad. There are many spruce averaging fifteen feet.



Robert L. Taylor

Nigella damascena

Natural size

[See page 96]

They are mostly Colorado green but interspersed are fine blue specimens. In many spots the blue form has been used as an accent with several of the green forming a background. A few red-leaved plum have been introduced into the landscape. Tulip tree has been used in some areas. There is a good planting of Oregon hollygrape and some of the species lilacs.

Here again elms, Norway maple, Chinese elms and many rather common species of shrubs have been used. On the lots where they have been planted by the owners are many kinds of evergreens, similar to those in Mount Greenwood.

While cemeteries may be depressing to some because of associations yet the cemeteries as a group provide an excellent opportunity to observe the use of plant material in the landscape and to see their behavior when left with a minimum of care for a reasonable time, as most cemeteries do not have the time or labor to do more than prune and spray the landscape material at intervals. Frequently the material in cemeteries may be different from that commonly grown as the planning is usually done by well-known landscape architects.

Certainly the larger and older cemeteries are becoming more and more like arboreta and bird sanctuaries which serve as an inspiration to the plant minded as well as an unconscious solace to everyone.

ELDRED GREENE.

Nigella damascena (See page 95)

Love-in-a-mist is the homely name by which this old-fashioned and much neglected annual was called, when in flower; but devil-in-a-bush is its name when the plant has given over flowering and devoted itself to the ripening off of its inflated seedpods.

As compared with zinnias, marigolds and petunias, this poor Old World annual would never have a chance to compete, but in the not too tidy garden, the sort of place that is taken over by self sown seedlings, it has a very definite place. It is of the easiest culture, if one or two things are remembered.

The seeds are large and black and germinate well in early Spring. It is quite safe to sow them as early as one would sow annual poppies. Light freezing will delay the germination, but as soon as the temperatures suit them, the seedlings appear with rather large seed leaves of a tender green color. The young seedlings do not like transplanting, so if you have not sown the seeds thinly, pull up the excess and don't bother to transplant. Only stunted plants will repay you. Growth is steady and fairly rapid, with flowering on the principal stalk within a month, and the branches coming along rapidly. By the end of June, the life cycle will be finished here, Washington, D. C., and the plants can be pulled up.

Buy good seed and cull out all plants that show a poor color. The best hues start with aquamarine and deepen to almost purplish blue. All the paler tones are insipid. Be as harsh about this as you should be with all the silly new "art shades" in cornflowers, and the self-sown seedlings that come up the following Spring will be decent colors and not all pale hues.

There was a time when a strain named for Miss Jekyll could be had and perhaps it will appear again, although the present generations may not even recall the famous British gardener for whom that stands! And there are other species of *Nigella*, but they rarely come into commerce and probably would not be too intriguing.

The flowers last quite well when cut or rather the secondary buds develop well enough so that a cut spray pre-



Robert I. Taylor

Impatiens Balsamina

Natural size

[See page 98]

sents a good appearance for some time when kept in water.

The photograph shows the details of the plant and flower habit and those of the seed pod as well. It also records a strain of merely ordinary value, as flowers in good strains should have many more colored bracts. If the size were not so different, one might think of a fine clematis flower-in-miniature, set down upon a fine green ruff.

In adversity, whether of poor soil or drought, this is one of the annuals that will make one flower on a tiny stem, mature its seed and die. In some plants this is intriguing, in this one starvation is too obvious.

Impatiens Balsamina (See page 97)

This is another old-fashioned annual that has fallen on neglectful days. It was once common enough in dooryards and had the attention of many a faithful gardener who bought good seed, fed his plants well and expected a certain level of performance.

It is a good plant for a beginner, a very beginner. The seeds are large enough to be easily handled, can be planted late in the season. They germinate quickly in warm weather (they stand no frost in this stage) and the seedlings are large enough to transplant as soon as they have germinated.

The plant illustrated in the figure is from ordinary seed. In fine strains bred and maintained "before the war" the individual flowers would have been more symmetrical and more completely double so that they sat like small camellias along the stem. Many flowers are produced in the axil of each leaf so that blooming continues for a long period, all through the hottest weather during which the plant shows no sign of unhappiness, unless you skimp it on water.

Since most of us live where the summers are hot, this tropical annual is not

to be despised. If you don't like the colors you get, save seed from those you do like until you get your own strain. If you prefer singles, choose only those.

The colors that came in the seeds from the ordinary package were white, several tonalities of pink all on the coral to peach side, and red. There were none of the remembered magentas, nor any of the spotted forms. There were no full doubles. Cutting off a whole plant or a main stalk in flower, one may have them in the house for at least a week. The old flowers fall quite decently and neatly and new ones take their place. Or one may cut the single flowers and float them, if one likes that form of decoration. Or again, one may arrange them, in moist sand, so I am told, until the whole dish is filled looking like an old fashioned nosegay without the paper frill.

Children, and not a few adults like to touch the ripened half translucent pods and watch the seeds scatter!

But the chief interest in the little planting last year was in the fact that our first early frosts did not hurt the plants but seemed if anything to intensify the colors.

Reprints.

On pages 99 and 100 are reprinted photographs engraved for use in earlier issues, one is *Shortia salicifolia* and the other is a fruiting branch of *Cotoneaster salicifolia*, which was shown in its flowering state in one of the recent issues. It illustrates a nice point, namely that evergreen leaves are not eternal! If one compares the number of leaves per spur in the flowering branch with those in the fruiting, he will see for himself. *Shortia*, we need not remind you, is one of the most lovely of native plants, with a pleasant history as well.



E. T. Wherry

Shortia galicifolia



L. A. Guernsey

Fruits of Cotoneaster salicifolia

Wanted!

Seed of the old fashioned Banana Muskmelon. The modern streamlined improved, etc., are not wanted.

A. E. KUNDERD,
R. 2, Box 48, Goshen, Ind.

Decorative Grasses. Seeds or plants together with anything printed in connection with this subject.

L. C. VIRGIEL,
906 Iliff Street,
Pacific Palisades, Calif.

Wanted, rare varieties of cacti, succulents, and other house plants. I have quite a large collection and am always looking for new varieties.

CARL VIASAK,
4150 E. 116th St.,
Cleveland 5, Ohio.

Seeds, cuttings or young stock as may be most desirable.

Quercus cornea,
Alocasia macrorrhiza, true type
A. macrorrhiza variegata
A. cuprea
A. Sanderiana
Callicarpus sp. (Tree scarlet fr.)
Cyperus alternifolius variegatus
Cryptostachys lakka
Citrus ichangensis
Citropsis spp.
Atalantia spp., esp. *A. Guillauminii*
Glaucena lansium or wampi
Aegle marmelos, the Bael of India
Aegelopsis chevalieri
Balsamocitrus Dawei
Hesperathusa crenulata
Feronia limonia, the wood apple
Feroniella lucida.

All material will be purchased at prices mutually agreeable.

M. MORAN, Star Route,
Bay St. Louis, Mississippi.

Indian Azaleas

The editor himself would like to hear from members who are growing or who are familiar with named varieties of these useful Southern shrubs, that may not be available through regular nursery channels or only from small local nurseries that do not issue catalogues. If you have such varieties in your own garden or if they grow in your neighbor's garden, a letter will be appreciated, telling particularly, where plants can be bought if such are available.

The editor would also like information as to the use of the common old Azalea, which is known as *indica alba* in many gardens, but which does not really belong in the "indica" group, save from an historical point of view.

It seems desirable to begin a collection of all such information, in order that a complete check list may be worked out and some record be made before it is entirely too late. It is repeatedly said that varieties survive in our South that have long been lost in Europe; this is probably true but in some cases the varieties have been surpassed by later forms more amenable to the florists' uses and less useful out of doors.

The editor would also be interested in hearing from any member about this type of plant, particularly the hardiness of the varieties that the member may be growing, hardiness being understood in this case as resistance to frost in spring for the developing flowers and in winter for the plant itself, particularly the one-year wood.

In coming to the publication of Volume 25 of the NATIONAL HORTICULTURAL MAGAZINE, it seems well to take one page to record the appreciation by the Society and the Editor, of the unfailing support of the Members who have made the Magazine what it is. To each person, who has contributed to the work, our sincere thanks.

The problems that have confronted us in the work have not been few. Probably the chief difficulty has been that of winning more and more people to the belief that in spite of the great size of our Country, it is possible to interest gardeners in all parts of the Country in the work that is being done over the whole. Not all are convinced as yet and there are many gardeners who still do not see beyond the immediate horizons of their own neighborhood, unless it is to see something that they must bring into their own gardening from elsewhere.

It is true that gardening as a whole has had an enormous development during these years in which war and serious depression have marred the ordinary expressions of individual life. If it were not an apparent paradox, it might even be argued that these have aided in the growth of horticultural pursuits. Some horticultural activities have had to be held in abeyance, but others have been stimulated and more persons have turned to gardening than ever before. For those to whom this was a truly first experience, it has been a revelation of a world new and splendid in ways they may not have expected.

It is true also that science has turned an attentive eye to the garden world and that the skill of the scientist has been added to those other skills that have already been in action for centuries.

What lies before us, is not for present prediction. Of one thing we may be certain, however, and that is that in the gardener's hands is the safekeeping of much beauty, something that cannot be underestimated in the life of any people.

In one friendly letter of criticism, it was urged that the Society had no slogan! It seems to some of us that it needs no slogan, but if it must have one, why not urge merely a quickening of the sense of beauty that can be found in this garden world.

In the twenty years that the Magazine has been in the hands of the present editor, it has grown but it has not achieved the full stature that it will attain. It has grown, however, as we have said before through what the membership has done, in which we have been only the agent. It is pleasant to know that in the years to come, others will join the groups that have already made so much progress toward a national goal and that the present group need have no fear, since the goal does not change.

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(Continued on inside back cover)

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Claude Hope

Tagetes signata pumila

[See page 146]

Concerning Marigolds

Each year the magazine-reading American public is treated to a series of articles in which the novelties in the field of annual plants are reported with photographs that tend to a dreary sameness of fat overfed blooms quite devoid of any virtue save their fatness. Little is said in the public prints as to the committee that made the selections and the awards and less is said about the cultural procedures that produced the plants to be judged or the photographs for popular consumption. From what can be learned 'behind scenes' the materials are grown under what may be conceived of as ideal conditions, with trained gardeners to attend the greenhouse sowing, later transplantings and usually a fine open field for the final readings.

Almost nothing of this has the slightest relation to the happenings in the garden of the general seed-buying public. Rightly or wrongly the public that buys the seed may or will disregard instructions, sow too early or too late, plant in shade instead of sun, fail to transplant and all the rest of it. Doubtless this makes the producers groan a little, but as they already have their money, they won't groan too desperately.

With the cooperation of three members of the Society, the editor bought from four seed houses, a group of marigold seeds which were divided among the four and subjected to ordinary garden procedures, neither better nor worse than what any one of the great American buying public might offer. No thought was had to discredit any of the offerings; it was merely hoped to show how the plants performed under these 'consumers' rather than

'producers' conditions and to find how far such a test might go toward approximating the tenderly nurtured 'specialists' plants. Looking back, it is now regretted that all the marigolds in the 1945 market were not purchased so that once and for all, the whole story could be recorded, but this very lack of completion, while indefensible from one point of view, is perhaps not unlike the practice of the ordinary buying public.

The members who risked the trial were Miss Estelle Sharp who lives in Pennsylvania; Mr. I. N. Anderson, who lives in Pass Christian, Miss.; Mr. Claude Hope who was then gardening in Costa Rica and the editor who has his garden just outside of Washington, D. C. Each of them will speak for themselves as to the conditions under which they planted the seed and so on, but it should be recorded here that no request was made of any, to work out an elaborate and solemn record, merely the facts that would interest any consumer; what seed germinated and how well, how long it took to the first flowering, personal likes and dislikes that were aroused in the progress of the cropping! The editor has not attempted to "coordinate" the results which are not complete in any case, nor has any effort been made to "interpret" the findings. Capitalized color terms indicate the familiar Ridgway.

His own chief duty was to get photographic material of all, so that if photographs from the other tests were not forthcoming, there would be something to report in that fashion. Since Mr. Hope was successful in getting pictures, those used come from both sources.

Pennsylvania

Seeds were sown in a coldframe with the exception of those of Flash, sown in the field. The only fertilizer used was a trowelful of rotted leafmold mixed with wood ashes and placed in the hole at transplanting time. Plants were grown on land formerly manured and used many years for vegetable gardening. Only one dozen plants of each variety were grown. There were 56 varieties though there were seed from 65 packages, the difference representing duplications.

A few preliminary remarks may be entered here not as a tightly knit summary but rather as points of interest.

Only two varieties, Clinton and Oriole, were attacked by Japanese beetles.

Outstanding varieties: French Double, Harmony, Scarlet Gem and Sunkist; French single, Flash; French Tall, Flaming Fire; Hybrid, Idabelle Firestone; African, Peony-flowered, Orange Supreme; African Carnation-flowered, Mayling, Yellow Supreme.

Early to bloom: Butterball, Harmony, Mahogany, Spry, Sunkist, Flash, Flaming Fire, Wildfire, Yellow Pygmy, Pot o' Gold, Early Sunshine.

Varieties killed by frost before blooming: Golden Ball, Australian Giants.

Varieties which the casual observer would never mistake: Goldsmith, Mayling, Ferdinand, *Tagetes signata pumila*.

Each of the 56 varieties was distinct from all the others although in some cases the distinguishing characteristics were not particularly favorable from the point of view of the horticulturist. For example: Fire Cross is similar to Legion of Honor but slower to bloom. Clinton is similar to Tetra but is taller and the flowers are smaller. Early Sunshine is similar to Limelight

but earlier and with flowers, lemon yellow rather than green yellow.

Mississippi

The soil in this area is essentially sandy and light in texture with considerable humus, which is increased by the usual practices in cultivation. The best time for sowing annuals is in February when there is sufficient heat to insure good germination and time enough to allow adequate development of the plants before the long period of summer heat sets in. Seeds for this test were sown in April. Germination began in three days with such varieties as Sunkist, Double Harmony, Scarlet Glow, Spry and the other dwarf French types. Nearly all the other varieties germinated by the fifth and sixth days. Two, Red and Gold Hybrids and Wildfire took 13 days. Sowing was done in the open and transplanting was made into well fertilized borders with other plants. Positions sunny, but not in full sun for the entire day.

Washington D. C.

All sowing was done out of doors, May 18th where there was excellent germination except as noted. First transplanting during the first week in June with a second transplanting of the 7 spaced plants during the last week in June. An experimental transplanting of the Dwarf French types was made in July, with a severe pruning of the tops. This, though accompanied by careful watering had no adverse affect on the growth and development of the plants but did delay the mass production of later flowers. The soil is a good mica schist, that had been fertilized for vegetables but which had been lying fallow for several years. The situation was in good sunshine for about 5 to 6 hours per day after which shadows from distant trees fell



Robert L. Taylor

African Alldouble Orange

over it. No fertilizer was given and no other care than watering at the times of transplanting. The site was high and has good air drainage so that the frosts of October 3d had no effect on the plants which were not killed until the much heavier frost of November 3.

Costa Rica, C. A.

A word of explanation is necessary concerning the conditions in Costa Rica before considering the varietal comparison. First of all, it may surprise many readers to learn that the temperatures averaged lower than those in the greater portion of the United States. Appreciable and consistent differences in temperature are associated with even small differences in elevation in the tropics. The marigold plantings were made at elevations of 2000 and 4200 feet. At the former the daily maximum temperatures were around 78 to 86 degrees Fahrenheit and the daily minima were from 60 to 65 degrees. At the higher elevation, the temperatures were about 10 degrees lower. At both places, they were remarkably consistent, seldom falling outside the ranges indicated. Compared to the summers in the United States, both locations are, of course, cool. The lower elevation would roughly correspond to summers in the higher parts of the mountainous regions of the South and West and to the southern Pacific Coast, the Great Lakes region and upstate New York. The higher elevation would correspond to the northern Pacific Coast and New England. Of course, the growing season is not limited in Costa Rica as in all the North American locations, nor are there the initial and terminal cold periods so characteristic of the temperate zone summer.

When the number of plants of a variety exceeded 12 to 15, it was

divided and planted at both locations. Otherwise, all the plants were set at San Antonio, at 4200 feet. This proved to be an error because of difference in soil fertility of the two places. It was well known that the soils of San Antonio were badly leached and immediately after planting sesame seed meal was applied. As luck would have it, however, little rain fell in the succeeding three or four weeks and the fertilizer did not become immediately available. As a consequence the plants were very slow in growing off and many failed to recover.

At the lower elevation, Turrialba, the soil was much better and the plants grew off very satisfactorily.

In many instances, a variety succeeded only at Turrialba. In those cases that afforded comparisons at both sites, it was found that the growth was harder and more compact and the colors richer at San Antonio. In the French varieties, the plants were appreciably shorter. To judge by the catalogue descriptions, the growth in the lower temperatures was approximately typical of that in the United States, in the French varieties. The reverse was true of the African varieties, in which the growth seemed more typical in the Turrialba planting.

Since both the French and the African types are native to the tropics, it is not surprising that they showed no adverse reaction to the short days that are characteristic of the summers of the tropics.

Of the main comparison, all the seeds were sown on 11 May. On 27 May, an additional small group was sown, consisting of a resowing of varieties that germinated poorly and of two or three that were not in the original set. Later still, on July 2, another sowing was made of new lots of seed of varieties which had failed in the first sowings and of a few

*Claude Hope**Lémon Queen*

varieties not included in the original lots. These last were all planted at Turrialba and for some reason did not perform as well as the first lot. No

direct comparison could be made, therefore, between the two lots but some comment is possible concerning the varieties.

No color chart was available but most of the African varieties were compared directly and ranked by color. The following list gives the varieties arranged in order from lightest to darkest tone. It was not possible to include some varieties.

Color Scale of African Varieties:

Limelight, Mayling, Yellow Supreme, Crown Prince, Canary Bird, Mammoth Mum, (All double Lemon),* (Lemon Queen), Early Sunshine, Oriole, Golden Supreme, Golden Bedder, Golden Jubilee, Yellowstone, Goldsmith, Golden Emblem, Golden Eagle, Victory, Pot o' Gold, Tetra, Orange Supreme, (Orange Sunset),* (Clinton), Crown of Gold, Alldouble Orange.

* No difference could be detected between the members of the pairs enclosed in parenthesis.

It is unfortunate that Guinea Gold, the prototype of the modern carnation-flowered marigold, could not be included in the color scale, due to a complete failure of the seeds to germinate. It was grown in the last group sown but by that time the varieties closest to it in color had gone by. It is possible, and likely, that it would fit in between Victory and Pot o' Gold where a slight gap was noticed between the otherwise regular succession of tones. Buff Beauty almost failed and could not be included.

As usual in a garden species that has had a good working-over by the seedsmen, there were some duplications and near duplications among the varieties. For example, there would never be any need to grow, among the French varieties, both Butterball and Goldcrest; Firecross and Legion of Honor; Gold Striped and Royal Scot; Harmony, Spotlight, and perhaps Spry, unless one wants both large and small plants with the same flower type, for

Spry is only a dwarf Harmony; Mahogany and Robert Beist. Among the African varieties, one would not need to grow both Alldouble Lemon, Lemon Queen, and Oriole; Clinton and Tetra; Early Sunshine and Sunrise; Golden Eagle, Golden Emblem, and Victory; Golden West and Guinea Gold; Goldsmith and Yellowstone; Orange Sunset and Orange Supreme; Pot o' Gold and Tom Thumb Golden Crown. It isn't that these varieties can't be distinguished; no real duplicates were discovered among the African varieties and only three pairs of the French varieties appeared to be duplicates.

In defense of the seedsmen, it must also be recorded that among the groups of essential duplicates listed above among the African varieties odorless foliage sometimes constitutes the chief distinction. For example, Clinton, Oriole, and Golden West have odorless foliage. This must be considered an achievement for the breeder rather than otherwise, making it possible for one to "follow his nose" without giving up some other feature.

To offset the above grouping, the truly desirable, distinctive varieties must be recorded. To consider first the French group, we have Butterball with its somewhat elongate yellow flowers flecked at the tips of the petals with brown; Ferdinand with its gay colors of dark red rays and yellow disc florets; the Firecross-Legion of Honor pair with its neat growth and many golden yellow flowers, blotched with crimson in the centers; Flaming Fire, gay with its variable blotches and polka dots of red on a yellow field; Flash, truly outstanding with its mass of large, brilliant, orange-scarlet, single flowers; Golden Ball (not to be confused with the African by that name) with its exceptionally large, very double flowers of deep gold; the Gold Striped-Royal Scot pair, if you like gypsy colors;



Robert L. Taylor

Buff Beauty

Harmony with its many superior qualities, thoroughbred that it is; Lemon Ball (again not the African variety) with its myriads of clear yellow, double

flowers; Scarlet Glow for its large double showy-red flowers with a distinct scarlet glow; Sunkist for a long season of perfectly formed, double,

orange jewels; Wildfire, a tall Legion of Honor, with slightly larger flowers, and finally, Yellow Pigmy with its very dwarf plant carrying clear yellow flowers in quantities.

In the African group, warmly satisfactory varieties were: Alldouble Orange, darkest of the large-flowered group; Canary Bird for its light yellow flowers that blend so well; Crown of Gold for its very dark color and strong stems; Crown Prince, although identical in type with Crown of Gold, for its pale yellow flowers; Early Sunshine for its spreading branches, early and long season of bloom and tidy flowers; Golden Bedder for its early flowers and neat branching habit; Golden Supreme for its large flowers of distinctive form; the Goldsmith-Yellowstone pair for medium tone chrysanthemum type flowers; Lemon Queen for its large lemon-yellow flowers in great abundance; Limelight for its tidy pale flowers, though some may object to the green tint, and its spreading branches; Mammoth Mum for all the world like an incurved chrysanthemum, by all odds the largest of its type; Mayling for its soft yellow flowers, lightest of all the carnation-flowered type, and its many tiers of ruffled ray florets standing out like the much ruffled skirt of a ballet dancer in a pirouette; Orange Sunset for its rich orange flowers of great size and substance; the dwarf Pot o' Gold for its earliness, dwarf habit, and spreading branches; Victory for the size and abundance of its flowers; Yellow Supreme for its large peony-type flowers of pale yellow.

When grouped as to date of the first flower, the French varieties show a rather restricted range, spreading over about 4 weeks, inasmuch as precocity is the rule. However it should be recorded that Butterball, Ferdinand, Flaming Fire, Flash, Harmony, Spry,

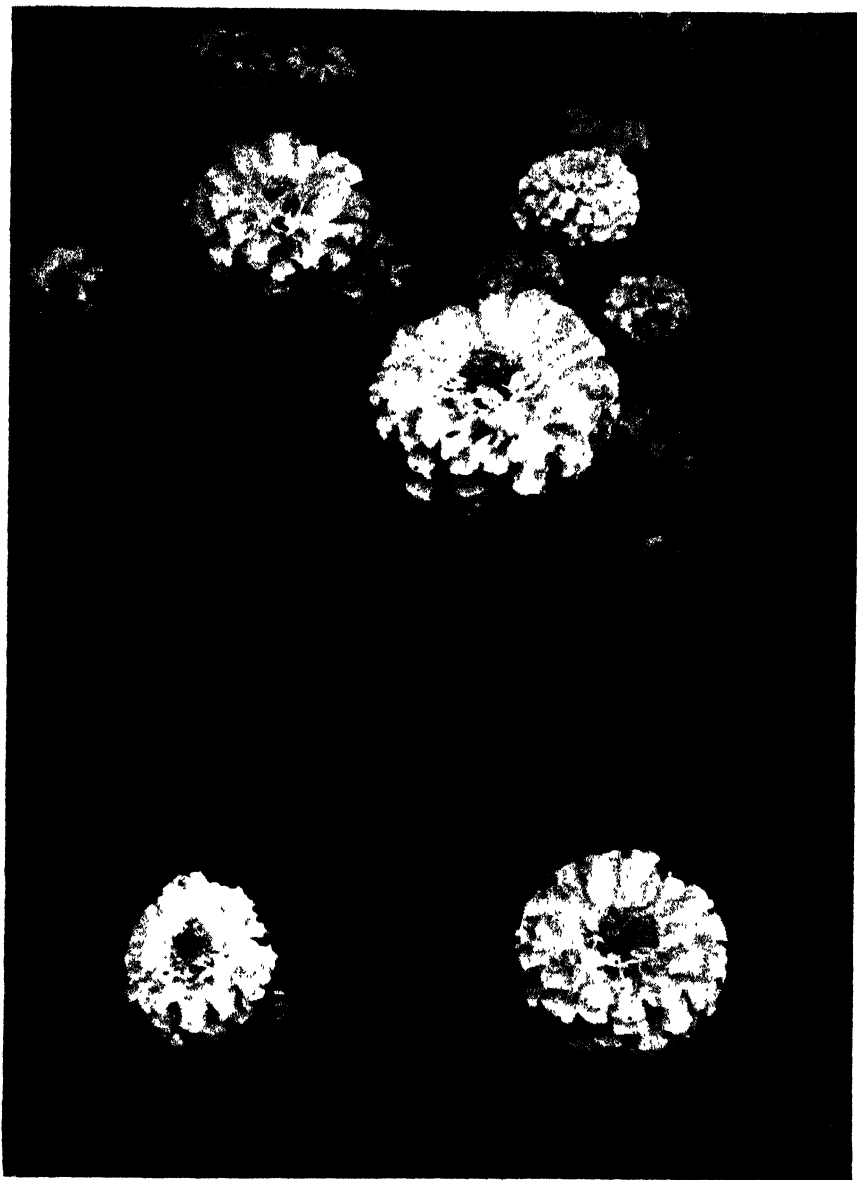
and Sunkist were early, while Golden Ball and Australian Giant were late, the latter, decidedly so.

Much more spread was noted among the African varieties with respect to the date of the first flower. Earliest were Pot o' Gold, Golden Bedder, Early Sunshine, Limelight, Canary Bird, Crown of Gold, and Crown Prince. Latest were Tetra, Golden Supreme and Mammoth Mum, the latter, especially so.

In preparing the notes that follow, the editor has combined the notes from the different sources adding the locality at the conclusion of the remarks of each reporter. The varieties have been grouped according to the types of flower, within the two sections, i.e. African and French.

ALLDOUBLE LEMON. African tall double, ball flowered. This variety with typically odorous foliage lived up to its name in both respects. The flowers were slightly smaller than those of Oriole and Lemon Queen, which they resemble. The flower peduncles were strong enough to be worthy of note. *Costa Rica.* Sown, May 26, first bloom, August 16; all came true to type and reached 5 feet. *Penn.* Good flowers, sparse bloomer, too tall. *Miss.* Tall, excellent growth habits, good flowers. *D. C.* Sown May 18, first bloom, September 12. Light Cadmium.

ALLDOUBLE ORANGE. African tall double, ball flowered. A counterpart of Alldouble Lemon except in color and size of flowers. It had the darkest orange flowers of all the African varieties. Two or three plants produced very tight doubles like the old-fashioned sorts, the rest differed little from the carnation-flowered type. *Costa Rica.* Sown, May 26, first flower August 21; one plant with single flowers, one with butter yellow and

*Claude Hope**Canary Bird*

not orange. *Penn.* Good flowers, much too large for their very weak stems. *Miss.* Excellent growth, more vigorous than Alldouble Lemon, several single

flowered forms. *D. C.* Sown May 18, first bloom September 4. Orange.

LEMON QUEEN. African tall double, ball flower type. Lemon Queen

belongs to the now small group of old-fashioned marigolds with tight double flowers, or so the catalogue claims. Actually the flowers differed little from those of the carnation flowered type. As a variety it differed from Alldouble Lemon only by its slightly larger size. *Costa Rica*. Sown May 26, first flowers, August 27. Larger flower than Alldouble Lemon. All true to type save one. *Penn.* Poor plant and poor flowers. *Miss.* No report. *D. C.*

BUFF-BEAUTY African dwarf double, carnation-flowered, odorless foliage. The seeds germinated poorly, only four plants resulting. All were planted at San Antonio with disastrous results. *Costa Rica*. Sown, May 14, first flower, August 5; rather deep for "buff." Odorless. Poor germination, shorter growth than others of this type. *Penn.* Very good flowers, good plants, midseason to late. *Miss.* Sown, May 18, first flowers, August 27. Light Cadmium, shaded in the heart with Deep Chrome. *D. C.*

GOLDEN CROWN, TOM THUMB. African dwarf, carnation-flowered. This variety was sown only in July, but performed very well. No direct comparison was possible, but, it seemed to be identical with the variety Pot o' Gold. *Costa Rica*.

CANARY BIRD. African medium double, carnation-flowered, odorless foliage. The plants were of medium height with spreading branches. The medium-sized flowers with ruffled rays fit neatly, as a carnation-flowered type about midway of the lightest quarter of the color scale. It is a color that sets of orange in a fine fashion. *Costa Rica*. Sown, May 14, first flower August 17; not such large flowers as described, shorter than most in growth. *Penn.* Strong, uniformly tall plants, good flowers, uniform color. *Miss.* Sown,

May 18, first flower August 30; Empire yellow, *D. C.*

POT O'GOLD. African dwarf double, carnation-flowered. This, perhaps is a forerunner of a new race of dwarf bedding plants with large, carnation-type flowers. Though not of the largest, the bright orange flowers were large, and were produced very early on spreading braned plants not exceeding 18 inches. The stems were quite long enough for cutting. It must be noted that the dwarf plant is obtained at expense of flower production and that, as often happens, the season was short. *Costa Rica*. Sown May 14, first flower July 8; Uniform in character, foliage sparse for size of bloom. A little more sturdy than Golden Bedder. Orange. *Penn.* Started out with good growth but with poor color of stems and foliage and then died. *Miss.* No report. *D. C.*

MAYLING. African medium double, carnation-flowered, odorless foliage. It is difficult to put a finger on the exact source of the charm of this delightful new variety; whether it is in the mellow quality of the pale yellow flowers or in the quilled petals, or in the frilling at the edges of the petals or the depth of the large fully open double flowers. The plants are a little too large to be called dwarf yet they are not tall. Likewise, the branching seems midway between the usual dwarf type and the tall type. It is definitely a desirable variety. *Costa Rica*. Sown May 14, first flower, September 8; almost cactus-flowered. Faint odor. Quite distinct and worth growing again. *Penn.* Died before flowering. *Miss.* Sown, May 18 first flower, September 12; Pinard Yellow, shaded Buff Yellow. *D. C.*

VICTORY. African medium double, carnation-flowered. A variety of



Robert L. Taylor

Gigantea, Pot o' Gold

medium tone that approaches Mayling in the form of the flower, but somehow escapes the charm of that variety. It was very productive and the flowers

were of good size. In appraising the varieties in an over-all survey, it was grouped with Golden Eagle and Golden Emblem with which it is nearly iden-

tical in tone. Among the three, Victory is definitely superior in form of flower and in abundance of flowering. The plants, however, are not as large, not quite attaining 30 inches. *Costa Rica*. Sown May 14, first flower September 8; quite floriferous. Height 3 feet. Paler than Guinea Gold and more ruffled. Regular in form. *Penn.* Poor weak plants. *Miss.* No report. *D. C.*

CLINTON. African tall double, carnation-flowered, odorless foliage. Aside from the dark tone of the flowers, darkest of all of this type, there was nothing truly distinctive about this variety. The plants were of medium height and the flowers of medium size with moderately ruffled petals. *Costa Rica*. Seed sown, May 14, first flowers August 27; taller than Tetra, rather similar in color, foliage with little odor but beetles ate it. *Penn.* Poor growth, color somewhat varied, but the flowers good. *Miss.* Seed sown May 18, first flowers, September 6; Cadmium Orange. *D. C.*

GOLDEN EAGLE. African tall double, carnation-flowered. Golden Eagle falls in the middle range of color for the African group, where it is difficult to achieve distinction. It is a good variety, with typically tall plants satisfactorily productive of flowers of a satisfactory color and size. Beyond this, one can say little. *Costa Rica*. Sown, May 26, first flower, August 30; Large flowers on 4 foot plants which did not stand up well. Petals loose and lightly frilled. Several lemon colored flowers appeared in lot. *Penn.* Flowers a little heavy for the rather tall stems. Died after one wave of flowering. *Miss.* Seed sown May 18, first flowers September 6; between Cadmium Yellow and Orange. *D. C.*

GUINEA GOLD. African tall double, carnation-flowered. This, the first

of the carnation-flowered type is still a good variety, both because the color falls in the middle range and the size of the plant is convenient. There is no essential choice between it and Golden West. *Costa Rica*. Seed sown, May 26, first flower August 28; did not do very well, perhaps crowded. *Penn.* No germination. *Miss.* and *D. C.*

ORIOLE. African tall double, carnation-flowered, odorless foliage. In other than the lemon shade of the flowers, which is distinct among the carnation types and particularly among those of odorless foliage, Oriole failed to achieve distinction with this observer. *Costa Rica*. Seeds sown, May 14, first first flowers September 3; not as showy as Golden Supreme but rather similar; foliage thinner. Beetles ate it. *Penn.* Died before blooming. *Miss.* Sown May 18, first flowers September 6, Orange Chrome. *D. C.*

SUNSET GIANTS. African tall double, carnation- and peony-flowered. This is a splendid mixture including both types mentioned and a complete color range. It is obvious that Orange Sunset belongs to this group, probably a single color selection, because similar plants occurred in this mixture. Some pale lovely yellows. The flowers were tremendous and the plants reached 4 feet. Flowering continued over a long season. Only fault was the presence of weak peduncles. *Costa Rica*. Sown, May 26, first flowers August 23; Lemon and orange, plants 5 feet tall, some with more odor than others. *Penn.* Huge flowers much too heavy for the stems, grew 6 feet tall, soon died, but gave two groups of flowers. *Miss.* Sown, May 18, first flowers September 4; Empire Yellow and Lemon Chrome. *D. C.*

TETRA. African tall double, carnation-flowered. The originator says that

*Robert L. Taylor**Mayling*

Tetra resulted from the doubling of the chromosomes of the variety, Guinea Gold. In other words it is a tetraploid. One wonders if it is worth the effort.

Its chief claim to distinction lies in the deep tone of orange, but there are other darker varieties. With a long growing season this may be a virtue, other-

wise it is of doubtful value. No direct comparison could be made with Guinea Gold, but it is believed that the flowers are larger, though not notably so. *Costa Rica*. Sown May 14, first flowers September 8; flowers larger than those of Clinton. *Penn.* Very tall, weak stems, heavy flowers, good for cutting. *Miss.* Sown, May 18, first flowers September 9; Orange. Not floriferous here. *D. C.*

CROWN OF GOLD. African tall, collarette, odorless foliage. Crown of Gold was the first variety with odorless foliage. Its flowers are a bit small, measuring only a little over 2 inches, but they are freely borne on long stems over a long season. With its color, second darkest in tone of all the African varieties, and its distinctive form, it is useful in flower arrangements for blending with other varieties. *Costa Rica*. Seed sown, May 26, first flowers, July 28; early, true except for one plant more vigorous than the rest, foliage odorless. *Penn.* Very weak plants to 5 feet, sparse bloomer but with grand flowers much too heavy for the stems. *Miss.* Seed sown, May 18, first flowers August 6; continuous bloom over a long season, color carries very deeply because of the shadows formed by the crown-petals which in a way suggest the early trollius, *D. C.*

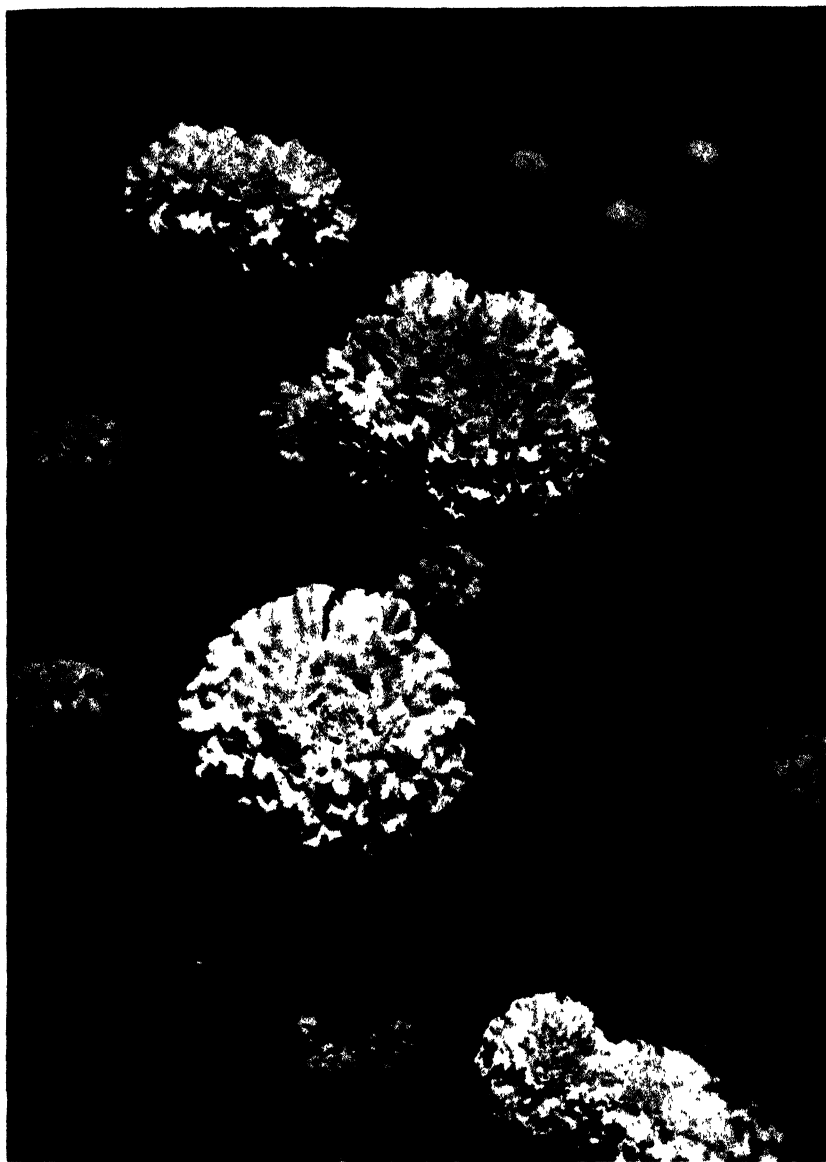
CROWN PRINCE. African tall, collarette, odorless foliage. Like Crown of Gold in all respects save color which falls at the other end of the color scale. It is fully equal its prototype in usefulness. *Costa Rica*. Seed sown May 19, first flowers, September 4; more vigorous plant than Crown of Gold, taller to 40 inches. All uniform. *Penn.* The best of the type, perfect blooms, cut and come again, good quality. *Miss.* No report. *D. C.*

CHRYSANTHEMUM-FLOW-ERED HYBRIDS. African double. This supposed mixture proved to be

almost a single variety. There were a few plants of the types of Limelight and Early Sunshine, but the majority appeared to be identical with the varieties Goldsmith and Yellowstone. The plant size, varied accordingly. *Costa Rica*. Seed sown May 19, first flowers, August 4; all proved to be Limelight. *Penn.* Plants very weak, soon died off, but flowers good color and shape. *Miss.* All Limelight. *D. C.*

EARLY SUNSHINE. African dwarf double, chrysanthemum-flowered. The originator claims that this is an improvement over Early Dixie Sunshine (not in test) and in size of flowers it is definitely better, but nothing can be said of improvement in foliage. No direct comparison was made in flower color but there is little difference. The plant habits are very similar; dwarf, full-foliaged plants reaching about 2 feet with many spreading branches, flowering over a long period which begins early. *Costa Rica*. Seed sown, May 15, first bloom, July 23; guard petals less conspicuous than those of Limelight. Irregular in height from 1 to 2 feet. Flowers not as large as described. *Penn.* No better than Chrysanthemum-flowered hybrids. *Miss.* Seeds sown May 18, first flowers August 27; between Lemon Chrome and Lemon Yellow. *D. C.*

GOLDEN BEDDER. African dwarf double, chrysanthemum-flowered. This is one of the truly distinctive varieties and is just what its name implies. Of course, it can be cut, but one finds it difficult to do without destroying the plant which rarely reaches 18 inches and usually is much smaller. It branches from the ground up and each branch flowers almost as soon as the main stem. As a result, one has a glorious burst of flowers for a relatively short season and if the plants are not given attention, nothing more. With

*Claude Hope**Victory*

some care in cutting and some feeding, a second crop can be induced but the flowers will be smaller, which is disappointing as the first crop is not of

very large flowers. *Costa Rica*. Seeds sown May 25, first flowers July 23; runs true, not enough plant for the size of the flowers, and the plant was

not a "mound" as described. *Penn.* Matured only one flowering and died. *Miss.* Seed sown May 18, first flowers, July 30, made a very fine first show but very poor thereafter in spite of an attempt to stimulate growth by cutting. Cadmium Yellow. *D. C.*

LIMELIGHT. African dwarf double, chrysanthemum-flowers. If not the first, Limelight was among the first of the chrysanthemum-flowered types and it is still a choice variety, unless one objects to the green in its flowers or their small size. To this observer, both are desirable since one never worships size in flowers to the exclusion of other features and small flowers are particularly desirable if produced on graceful plants. Limelight, with its early flowers of palest tones, produced over a long season on heavily branched dwarf plants well clothed (in Costa Rica) with small leaves, is a delightful variety. *Costa Rica.* Seed sown May 19, first flowers August 5; similar in general effect to Early Sunshine though greener yellow, guard petals more pronounced and broader. Rather weak in foliage and nice, such as it is. *Penn.* Poor. Early but nice dwarf plant with early flowering that continued for a long season. *Miss.* Seed sown May 18, first flowers August 13; poor growth and habit but continuous flowering over a long season. Color not pleasant to this observer. *D. C.*

GOLDEN JUBILEE. African tall double, chrysanthemum flowered. This was planted only at San Antonio and was almost lost. Not enough plants matured to give an idea of the range of color but the catalogue says from yellow to orange. *Costa Rica.* Sown May 26, no germination; June 25, first flowering September 7, orange and yellow. *Penn.* Matured one crop of flowers and then produced another. *Miss.* Seed sown

May 18, first flowers September 12; Capuchine Yellow. *D. C.*

GOLDSMITH. African tall double, chrysanthemum-flowered. The catalogue claims a larger size for this than was actually obtained. Nevertheless, Goldsmith proved to be a delightful variety with tidy chrysanthemum-like flowers of deep golden tone, almost old gold. It is a medium early variety and continued to bloom for a long season. The plants were not strictly tall running about 30 inches. *Costa Rica.* Seed sown May 15, first flowers August 23; very distinct, good foliage. *Penn.* Good flowers, good stems and foliage good throughout the season, one of the best. *Miss.* Seed sown May 18, first flowers September 4. Excellent, Cadmium Yellow. *D. C.*

MAMMOTH MUM. African tall double, chrysanthemum-flowered. Mammoth Mum is surely the first of a new race of large chrysanthemum-flowered marigolds. It makes this type available in flowers as large as those of the carnation-flowered types. It seems better suited for the cutting garden than for bedding as the plants are very upright in growth, tall and a little late in season. The color is lemon bordering on gold. Contrary to its name, one would have to call the flowers small in comparison to chrysanthemums but among marigolds they are large. It should be noted that the flower stems were strong and the flowering season short in *Costa Rica.* Seeds sown May 19, first flowers August 21; larger than Yellowstone, looser and a greener yellow. Three feet tall and over. *Penn.* Good plant early, poor later but with grand flowers, something like Limelight. *Miss.* Seed sown May 18, first flowers August 13, fine. *D. C.*

SUNRISE. Seed sown May 25, no germination; sown June 25, first flowering mid-September. Color deeper

*Claude Hope**Clinton*

than that of Early Sunshine. Petals very compact, really an ugly flower in shape. *Penn.* No germination. *Miss.* No report. *D. C.* Mr. Hope reports

as follows on Early Dixie Sunrise, which was not included in the general test. Early Dixie Sunrise which is nearly equal to Early Sunshine is a dis-



Robert L. Taylor

Golden Eagle



Robert L. Taylor

Sunset Giants



Robert L. Taylor

Tetra



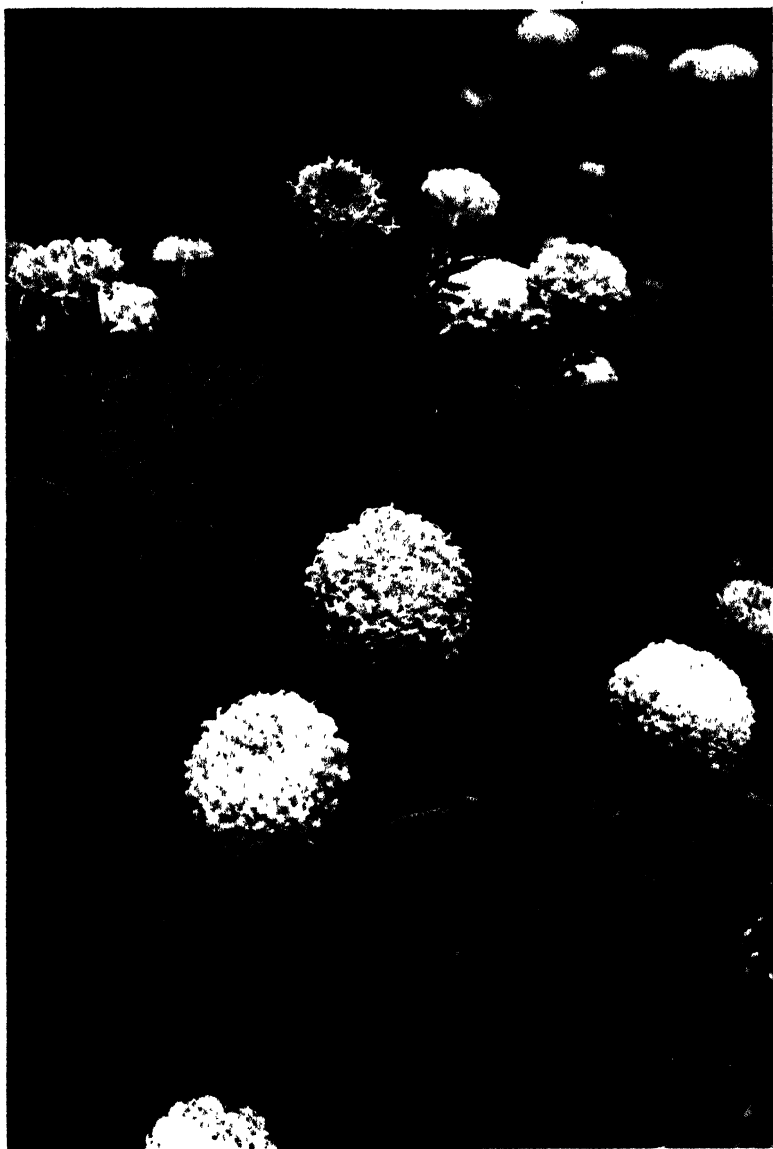
Robert L. Taylor

Crown of Gold



Robert L. Taylor

Early Sunshine



Claude Hope

Early Sunshine

tinctive variety that performed well at both sites in Costa Rica. It is another variety that was grown only from the July sowing. A variety Sunrise (our test, Ed.), possibly the same, failed to germinate in the first sowing. The foliage was particularly delightful as it was in all varieties of this class. In the United States, however, the susceptibility of the foliage to disease seriously detracts from some of the varieties. The bright color, the dwarf plants with spreading branches, and the very tidy, very early chrysanthemum-like flowers borne for an amazingly long season, all contribute to make this, or rather its improved form highly desirable. For some, larger flowers would improve it. *Costa Rica*.

YELLOWSTONE. African tall double, chrysanthemum-flowered. For this type, excepting Mammoth Mum, Yellowstone produced large flowers, yet for African marigolds as a group the flowers were below medium. As a variety it is not sufficiently distinct from Goldsmith to warrant growing both in the average garden particularly as it is later. The catalogue claims a distinction in the lighter tone of the flowers and in the larger plants. Only the latter was true to a perceptible degree in *Costa Rica*. Seed sown May 25, poor germination, eaten by slugs; sown June 25, first flowering September 5; some, the same color as Goldsmith, not more than 3 feet tall, stood without staking. *Penn.* Free bloomer, excellent flowers throughout the season, one of the best. *Miss.* Seed sown May 18, first flowers September 12; two colors, the dark flowers, Orange, the lighter flowers Cadmium Yellow. *D. C.*

GOLDEN SUPREME. African tall double, peony-flowered. This belongs to a new race of marigolds with a flower form that shows a fancied re-

semblance to the peony. In any case it is distinctive and attractive. The plants are robust and the flowers very large; with such a combination it is not surprising that the flowers came late, and were well worth waiting for. In the color scale, distinctly apart from the other large flowered types in the middle range. They are magnificent for cutting giving stems of great length, with peduncles stronger than most. The flowering continues over a long season. *Costa Rica*. Seed sown May 19, first flowers September 1; not as tall as Orange Supreme but over 30 inches. *Penn.* Fair in the early part of season, good late. *Miss.* Seed sown May 18, first flowers September 4; one rogue which had Orange flowers, all others Cadmium Yellow. *D. C.*

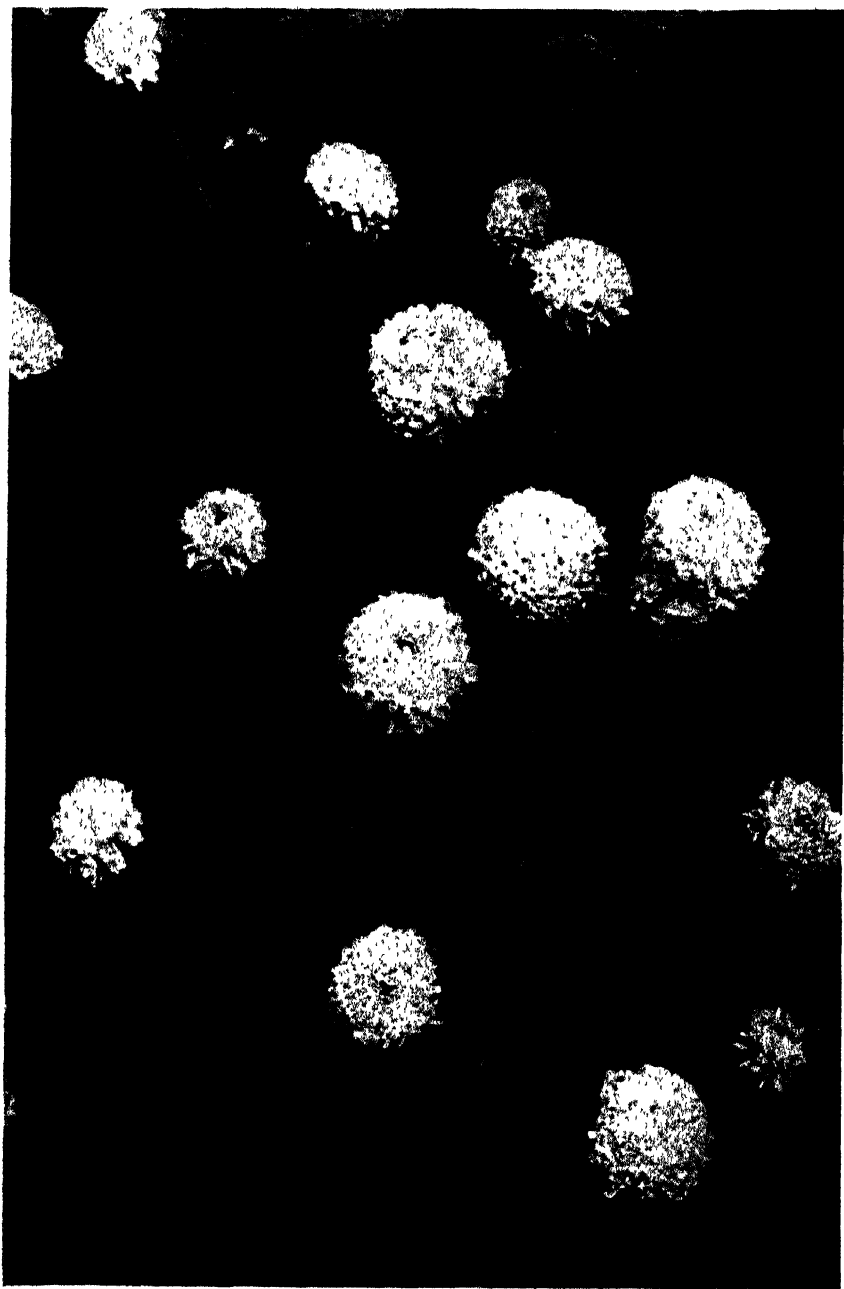
ORANGE SUPREME. African tall double, peony-flowered. This differs little from Golden Supreme except in color which is a rich orange among the darkest of the group. With all the "Supreme" varieties is shared the common fault of a peduncle too weak for the large flower. It is, in spite of this, a lovely variety. *Costa Rica*. Seed sown May 19, first flowers September 1; very floriferous, one lemon colored rogue, to 3 to 4 feet in height. Good late but only fair in the early part of season. *Miss.* Seed sown May 18, first flowers September 4; Cadmium Orange. *D. C.*

YELLOW SUPREME. African tall double, peony-flowered, odorless foliage. Yellow Supreme differs from the other "Supreme" varieties chiefly in the color which is near the light end of the color range. The plants are not quite as tall. Like the others it ranks as a very good variety. *Costa Rica*. Seed sown May 25, first flowers August 17; lemon yellow, 3 feet tall. *Penn.* Growth here is poor giving both inferior flowers and plants. *Miss.* No report. *D. C.*



Robert L. Taylor

Golden Bedder

*Claude Hope**Limelight*



Robert L. Taylor

Golden Jubilee

Half-opened flower; mature flower



Robert L. Taylor

Mammoth 'Mum

Young flower



Robert L. Taylor

Yellowstone

Young to three-quarters mature flowers



Claude Hope

Golden Supreme
(Half natural size)



Robert L. Taylor

Orange Supreme



Robert L. Taylor

Golden Glow



Robert L. Taylor

Goldsmith, left; Honeycomb, right

GOLDEN GLOW. African dwarf double, rudbeckia-flowered, odorless foliage. The originator claims that the flowers of this are like those of Rudbeckia Golden Glow, that they are borne in clusters on the ends of heavy branches that the plants do not exceed 2 feet in height and that the foliage is odorless. In the lot tested there is some mistake. Literally there were no two plants alike; one tall and single, several dwarf, some early and some late, some carnation-flowered, some orange, some yellow and some between. No check on variation of foliage odor. *Costa Rica.* Seed sown May 19, first flowers August 15; very irregular in form and height. *Penn.* Tall, weak stems, otherwise good. *Miss.* Seed sown May 18, first flowers September 6; Orange. *D. C.*

HONEYCOMB. African dwarf double, "unique flower form," odorless foliage. The seeds of Honeycomb germinated poorly and it is impossible to report on it from *Costa Rica.* Seed sown May 14, first flowers August 15; only one plant had the honeycomb effect, and the others grew 3 feet tall and did not flower. *Penn.* No report. *Miss.* Seed sown May 18, first flowers August 28. Not one of the most floriferous, but the flowers when fully opened showed the formation that distinguishes the variety. Orange Chrome. *D. C.*

IDABELLE FIRESTONE. African-French fertile hybrid. The introducer claims that the flowers are 2 inches across, which is supported by the hybrid origin. One wonders, however, if the plant as now grown is cytologically a hybrid. The flowers in Costa Rica were small, measuring only about an inch in diameter and there was nothing to show the influence of the African parent, but it must be admitted that only 4 plants were grown.

Two lots of seeds from two different seedsmen were sown and only two plants grew from each lot. All were alike, however, and except for the size of flower, agreed with the catalogue description of a tall plant bearing myriads of long-stemmed, double flowers of bright mahogany red. The catalogues did not say, that the stems were rubbery, serpentine and completely undisciplined, admitting only that a wide bed was necessary. *Costa Rica.* Seed sown May 26, first flowers July 27; variable in color, some more double than others. Sprawls, long stems, worthwhile. *Penn.* Very tall stems, flowers small, semi-double, good color, but never enough to cut until very late in the season. Cut some on November 6. *Miss.* Seed sown May 18, first flowers August 4; plants branch well but are not very erect, the flower peduncles are long and brittle and the whole mass is tangled. Many plants were grown and only two or three suggested the African parent being golden yellow with spots and blotches of brown. The remainder were fine wall flower reds and browns. *D. C.*

RED AND GOLD HYBRIDS. African-French sterile hybrids, tall double. The first lot of seeds of Red and Gold hybrids failed entirely; the second lot from another source produced two plants virtually identical definitely hybrids, but disappointingly devoid of any hint of red. They were wonderfully vigorous free-flowering African marigolds with very double

French Marigolds:

Idabelle Firestone

Josephine

Scarlet Glow

Ferdinand



flowers of medium-orange gold color. Growth stocky and heavily branched, but the crotches were weak and many broke from the weight of water on the foliage. The scores of flowers were 3 inches across, truly delightful in every respect but red flowers of the same type would be marvelous. *Costa Rica*. Seed sown May 15, first flowers mid-September. Very variable in type, color and height. *Penn.* Slow germination resulting in only 2 plants, poor. *Miss.* No report. *D.C.*

WILDFIRE African-French fertile hybrid, tall single. Wildfire proved less variable than the catalogue claimed. Like Idabelle Firestone it showed little influence of the African parent, but nevertheless it was attractive and a good performer. The first sowing germinated poorly giving only 8 plants which were surprisingly uniform. A later sowing germinated better but resulted in fairly uniform plants. The color was very similar to that of Legion of Honor. The flowers are appreciably larger, running about 2 inches across. For a tall French variety, the stems were well behaved. *Costa Rica*. Seeds sown May 14, first flowers July 6; Some all orange, some suffused with red and most with a red blotch at the base of the petal. All single. Uniform in height. One plant had coarser darker green foliage than the rest. *Penn.* Very late, grand color, too tall, not free in flower here. *Miss.* Seed sown in May but first flowering not recorded. Much later than that of Legion of Honor. Ground color Light Cadmium with blotch of Morocco Red that fades a little lighter as flower ages. *D. C.*

BUTTERBALL. French dwarf double. The plant, in Costa Rica, is only medium dwarf, but is very free flowering. The flowers are charming both in the yellow color which is paler than most people prefer in butter, and

in the flecks of brown that rest lightly on the tips of the florets. The form might be called anemone. The flowering season was a bit short at Turriabla but longer at San Antonio. *Costa Rica*. Seed sown May 21, first flowers July 6; fulfills catalogue description, comes true. *Penn.* The plants were poor in the early part of the season but grew and flowered finely as the weather cooled, useful either for cutting or as a cut flower. 12 inches. *Miss.* Excellent, long season of flowering. Lemon Chrome, the tiny flecks are Morocco Red. *D. C.*

GOLD STRIPED. French dwarf double; this provides a bizarre color combination of two lateral stripes of red on each lemon yellow petals of the fully double flowers of medium size. The plants are dwarf and compact. In some plants the red forms a blotch similar to the pattern in Legion of Honor. Strikingly different color. *Costa Rica*. Seed sown May 23, first flowers July 23; not much of a stripe, not at all free in bloom, irregular in height. *Penn.* Grew to 2½ feet tall, weak growth, no stripes. *Miss.* No report. *D. C.*

GOLDEN BALL. French dwarf double. An interesting variety of great merit, this is probably doomed to failure in the United States because of its lateness. The plant is dwarf and the flowers are exceptionally large, very double, and unusually long lasting.

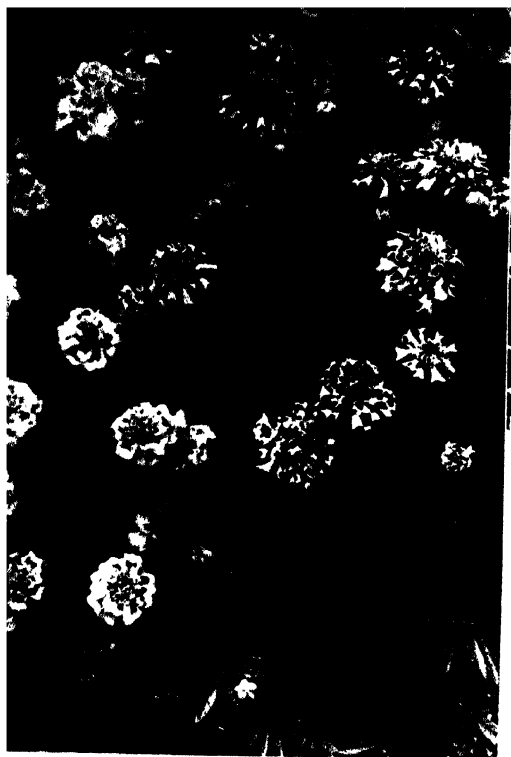
French Marigolds:

Royal Scot

Robert Beist

*Mahogany and
Spotlight*

Golden Ball



with strikingly long, strong peduncles. The color is distinctive for a French variety with a peculiar quality that would be desirable in an African variety. *Costa Rica*. Seeds sown May 23, in bud when killed by frost, October 3. Not as tall as Lemon Ball. *Penn.* Poor through the early summer but good in November. *Miss.* No report. *D. C.*

GOLDEN HARMONY. French, dwarf double. In spite of its name it does not look much like Harmony. The disc florets stand up stiffly and fit together like the cells of a honeycomb. The form is more like that of Butterball, but stiffer in appearance. The color is gold but many plants have a bit of red at the base of the disc florets, trying its best to break out. As a variety it flowered freely and was medium dwarf. *Costa Rica*. Seed sown May 23, first flowers August 20; smaller flowers than Harmony and not as free-flowered, petals more incurved, foliage hides blooms. *Penn.* Two feet tall, thin and very poor through early part of season but good in late, cool weather. *Miss.* No report. *D. C.*

HARMONY. French dwarf double. This variety is probably familiar to most gardeners as it has been a standby for some time. It may still be considered as outstanding and distinctive, a true blue blood. The plant must be called large for a dwarf class and the flowers are perhaps the largest of the French varieties. The two-tone color, red-maroon, predominating in the opening flower, gold in the maturing flower, is a nice blend. *Costa Rica*. Seed sown May 16, first flowers June 30; uniform, full of bloom. *Penn.* No germination. *Miss.* No report. *D. C.*

LEMON BALL. French dwarf double. Lemon Ball was outstanding at both sites for the abundance of

bloom, the cheery color and the long season of flowering. No other variety flowered so freely. The plants, though not exceeding 15 inches, spread out considerably. The color of the double flowers was a bright lemon yellow about like that of the African, Lemon Queen or Early Sunshine, *Costa Rica*. Seed sown May 23, first flowers August 25; not free in bloom, one plant was orange. *Penn.* Rather tall but a fair bloomer. *Miss.* No report. *D. C.*

MAHOGANY. French dwarf double. Mahogany produced quantities of large, fully double flowers on a plant almost too large to be called dwarf at Turrialba but satisfactorily restrained at San Antonio. One would be quibbling to find fault with anything but the color which is much darker than the hue one finds under this name in chrysanthemums. The seekers for black flowers might pause here. *Costa Rica*. Seed sown May 19, first flowers July 6; many breaks in color, with one plant solid orange. *Penn.* Good plant for bedding and cutting, best during the late season, free blooming. *Miss.* Too many individual plants with yellow and orange breaks. One excellent almost black. *D. C.*

MELODY. French, dwarf double. Melody is easily described as a very dwarf replica of Harmony with self-colored golden flowers much more like a golden Harmony than the variety called Golden Harmony. The flowers, 1½ inches across, are borne less abundantly than in Harmony. *Costa Rica*. Seed sown May 19, first flowers August 21; much more satisfactory than Golden Harmony, more bloom, uniform in height and character. *Penn.* Dwarf, good color, one of the best of this type. *Miss.* Entirely satisfactory performance, still in flower November 10, Orange. *D. C.*



Claude Hope

Lemon Ball

ROBERT BEIST. French dwarf double. Could not be distinguished from Mahogany and was listed as a synonym in one catalogue. *Costa Rica.* Seed sown May 21, first flower July 17; very variable in color and height and quite similar to Mahogany. *Penn.* Comments same as for Mahogany. *Miss.* Among the plants grown on, there were many more deep colored flowers than in the group saved from Mahogany. Uniform in growth and habits. Lemon Chrome variously marked with Garnet Brown to self-colored Garnet Brown. *D. C.*

ROYAL SCOT. French dwarf double. This could not be distinguished from Gold Striped. *Costa Rica.* Seed sown May 21 and again June 25; no germination. *Penn.* No germination. *Miss.* No report. *D. C.*

SCARLET GLOW. French dwarf double. This is an outstanding variety. Although the foundation color is dark it is enlivened by a scarlet sheen and by the gold line around the edge of each petal, as well as by the lighter tangerine tone taken by the aging flowers. The flowers are large and fully double; and the plants at San Antonio reached no more than 12 inches. *Costa Rica.* Seed sown May 21, first flowers July 15; rather variable, a red and "yaller" but quite distinct and very early. *Penn.* Good color, dwarf excellent habit, color became much lighter as season progressed. *Miss.* Crown when developed Light Cadmium, rest of flower Brazil Red through Morocco Red and Claret Brown. *D. C.*

SPOTLIGHT. French dwarf double. This is very much like Harmony except that the crested center is lighter in color and consequently brighter. The plant is about the same size. *Costa Rica.* Seed sown May 21, first flowers August 15; not enough good qualities to take the place of Harmony and char-

acteristics not distinctive. No germination. *D. C.*

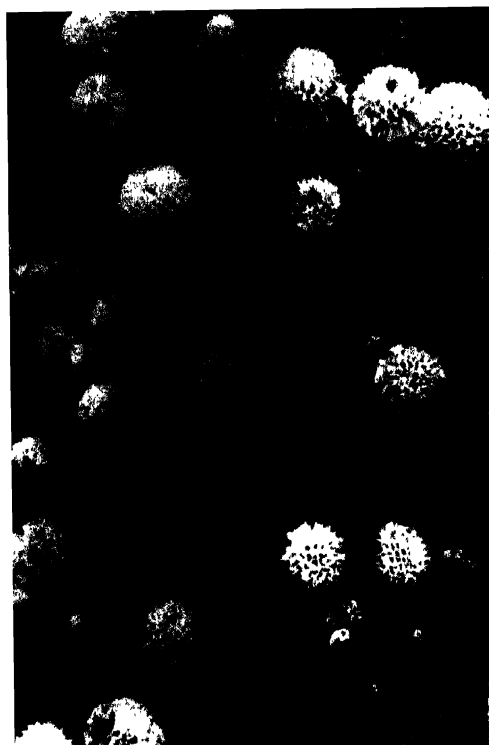
SPRY. French dwarf double. This is like Harmony condensed and is about 8 to 10 inches across and has extra flowers throughout. The center crest is lighter than that of Harmony. It is very dwarf but differs from Harmony in plant size. *Costa Rica.* Seed sown May 21, first flowers July 7; runs true, a dwarf. A little slow in making a crown, but fine midseason and late season but up to 2 feet. *Miss.* grand color. *Miss.* Cadmium, Ray-flowers Cadmium being lighter. *D. C.*

SUNKIST. French dwarf double. This is one of the outstanding varieties in several respects. It performed well for a long season, the color was alone among the French varieties being approximately the same as that of Pot o' Gold or Tetra, the flowers are little gems, the plants are tidy, reaching a height of about 8 inches at San Antonio. One plant among 15 was outsize. *Costa Rica.* Seed sown, May 19, first flowers June 30; catalogue description correct. *Penn.* The very best of all, very dwarf, good foliage, sturdy stems, excellent flowers good for bedding and even for cutting throughout the season. *Miss.* No report, except that the plants were in continual flower from late July to frost on November 3. *D. C.*

French Marigolds:

Golden Harmony
Double Harmony

Harmony
Spry



YELLOW PIGMY. French dwarf double. One might call Yellow Pigmy double dwarf in the sense that the plants did not surpass 6 inches in height. In many soils a litter or peat mulch might be necessary to prevent the rain splash from soiling the flowers. In most respects this variety is a very dwarf replica of Lemon Ball. *Costa Rica.* Seed sown May 21, first flowers July 9; very broad and bushy, comes true, full of buds when frosted on October 3, but had not been free of bloom. *Penn.* Really dwarf, good all around. *Miss.* Fine free bloom; Lemon Chrome to Lemon Yellow. *D. C.*

FIRECROSS. French dwarf single. The neat very floriferous plants reached a height of 12 to 14 inches at San Antonio and a little more at Turrialba, but they were a little irregular in size. The color is quite warm, almost gaudy, with the large overlapping petals light gold around the edge with a large irregular blotch of rich red at the base which recedes and fades as the flower ages. Those who like bicolors will want it. *Costa Rica.* Seed sown May 16, first flowers August 23; slower to bloom than Legion of Honor and not very distinct from it. *Penn.* Good, did not have many plants and all were slightly different in color. *Miss.* Light Cadmium flushed with Mars Orange to Claret Brown. *D. C.*

FLASH. A truly outstanding variety, Flash has only one fault; the fading color is not attractive in higher temperatures. At San Antonio, it was not objectionable. The flowers are large, symmetrical, and borne in great profusion on a medium-dwarf plant. One might wish that it flowered a longer season in Costa Rica, but doubtless this would never be a fault in the United States. *Costa Rica.* Seed sown in place June 7, first flower July 25;

profuse, a "mound" of bloom, worthy of its Silver Medal. *Penn.* Good blooms, much too heavy for the weak branching stems. *Miss.* Cadmium Yellow to Light Cadmium, washed with Maroon but fades to English Red. *D. C.*

LEGION OF HONOR. French dwarf single. Legion of Honor could not be distinguished from Firecross. *Costa Rica.* Seed sown May 16, first flower July 22; uniform in height, color and habit, over a foot high. *Penn.* Very poor, soon died, but the few flowers produced do not resemble those known in the North. *Miss.* Lemon Chrome, blotched with Garnet Brown that fades to Brazil Red. *D. C.*

AUSTRALIAN GIANT. French tall double. This variety has one virtue and many faults. The virtue is the flower itself. It is large, distinctive in form and bicolored, light clear yellow in the disc florets and rich dark red in the large ray florets. The form might be likened to that of an anemone chrysanthemum or a mourning bride. The outstanding faults are extreme lateness and the serpentine growth. *Costa Rica.* Seed sown May 23, did not bloom before frost on October 3, but buds were showing. *Penn.* Much too tall, crawling over the ground almost like a vine. Fair flowers but heavy. *Miss.* No flowers before frost which came November 3. Plants at that time about 6 feet tall and budded. *D. C.*

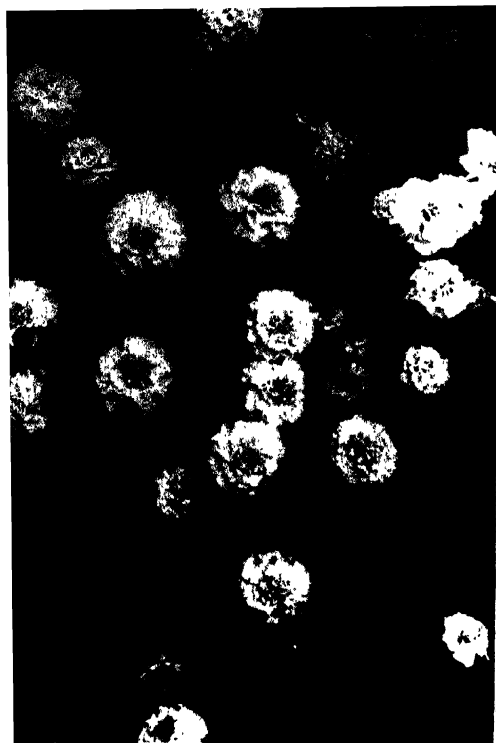
French Marigolds:

Yellow Pigmy

Butterball

Melody

Sunkist



FERDINAND. French tall double. A distinct and gay variety which reached about 30 inches in height at San Antonio and over 3 feet at Turrialba. The color is deep maroon in the rays and gold in the crested disc. The form is very like that of an anemone chrysanthemum. It flowered early in spite of its height. *Costa Rica*. Seed sown May 19, first flowers September 4; listed under dwarfs but grew 2 feet high, rather distinct. *Penn.* Grew to 3 feet, good flowers, foliage fair, much too tall for size of flowers. *Miss.* Not over 20 inches, late in coming into flower; disc, Cadmium Yellow, rays, Garnet Brown. One of the nicest for cutting. *D. C.*

FLAMING FIRE. French tall single. This variety is sure to be pointed out to the garden visitor because of its large, polka-dotted, scarlet-red-on-yellow flowers. The proportions vary from plant to plant and from flower to flower. Some few self-colored scarlet. The red fades to dull tangerine. Quite serpentine in growth, the plants attained a height of 4 and 3 feet respectively at Turrialba and San Antonio. *Costa Rica*. Seed sown May 23, first flowers July 9; large flowers some almost like Flash, others striped. *Penn.* Much like Josephine. *Miss.* Some flowers much like those of Flash, but usually with more ray florets. Colors from clear yellow to deep Scarlet Red—to Brazil Red. *D. C.*

JOSEPHINE. French tall single. Josephine is similar in all respects but color to Flaming Fire, though not as tall and a little more disciplined in growth. The two-inch, symmetrical flowers are uniformly rich crimson with golden centers, on stems long enough for cutting. One could wish there were more of them per plant. *Costa Rica*. Seed sown May 23, first flower September 8; height 40 inches, distinct but

too late. *Penn.* Somewhat more attractive than Flaming Fire; *Miss.* No report. *D. C.*

TAGETES SIGNATA PUMILA. Species, dwarf single. This is a charming plant, a species and well worth growing as it is. It is possible that it likes a cool summer for its best development for at Turrialba the growth was too long-jointed to be pleasing. The photograph was taken at San Antonio. There, the plants seriously rivalled Lemon Ball in floriferousness, probably actually producing more flowers, but since these were smaller, the effect was less impressive. The flowers are lemon yellow in the rays and appreciably darker in the disc. The feathery light green foliage greatly enhances the effect and is quite in keeping with the flower size. The heavy scent of the foliage has more than a hint of lemon oil in it. *Costa Rica*. Seed sown May 14, first flowers August 1; profuse bloom. *Penn.* Sparse bloomer, did not seem to like the rains and probably would have been better in a drier season. *Miss.*

It will be noticed that nearly all of the attention of the raisers of new forms has been devoted to the flower itself and that the most interesting developments so far have come from the modifications of the disc florets in what originally was the single flower. The gardener with an inquisitive mind can divert himself no end, by pulling apart some of his flowers to discover exactly how the modifications have come about.

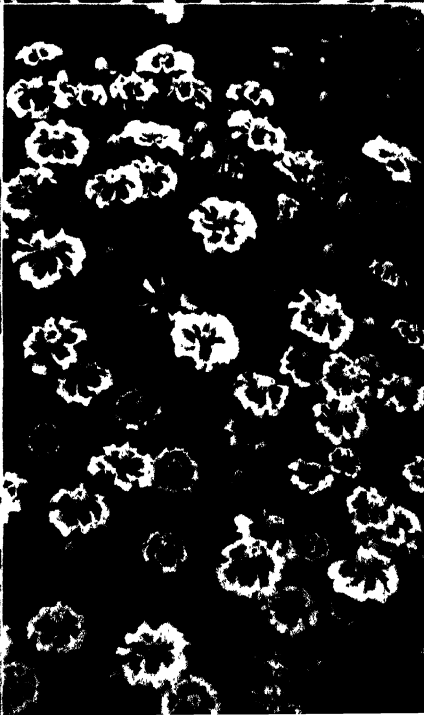
French Marigolds:

Flash

Flaming Fire

Ficry Cross

Legion of Honor



Nothing is reported here about the cultivation of marigolds but it is a safe surmise that nearly every gardener knows without being told. If any intrusive word of advice is needed it should be that he remember that they are much less frost tender, especially the French forms, than is often remarked; and that should he want to keep his plants as late in the season as possible, he must plant them in a place where there will be good air drainage, so that the cold airs of November will not settle about them in the night. He can fortify them further as cold weather comes on, if the place where they are planted is not too moist in the soil, in other words he will plant some of his plants in a dry place and water them as they may need during the long growing months, leaving them to dry off a bit as cold weather comes on. Treated so, they will often last as long as the hardy chrysanthemum, but only in the French sorts.

A word or two should be said about the photographs to illustrate the French Marigolds. All the habit pictures were taken by Mr. Hope in his plantings in Costa Rica; the close-ups were taken by Mr. Taylor from flowers grown either in the editor's garden or in the overflow that was cared for by Mr. Erlanson, another member not previously mentioned.

In taking the pictures of the African varieties, flowers were chosen at various stages of development. This was done deliberately since there are many

beautiful phases to be seen in many composites, long before the flower head reaches its ultimate diameter. As often as possible, they were photographed so that there is a record of the peduncle or flower stem showing the various types of leaves that adorn it or are missing. They are various. The specimens were chosen also to show the branching that might come from below the first axial flower, since that also is a matter of interest to the gardener. Only enough of the leaves are shown in the cases of the portraits to show the placement in relation to the flower itself; since we felt that the habit of the plants was sufficiently known and sufficiently reported in the pictures of habit character from Mr. Hope. If one will examine the photographs carefully he can find a wealth of detail that will remove his first querulous remark about their number and their apparent similarity. All the portraits are natural size unless marked, but no attempt was made to grow flowers for maximum size, nor to choose anything that would be representative of such feeding.

What lies ahead for us in marigolds? That is not to be said as yet. It is hoped that flowers the size of Africans can be achieved with the colorings of the French. It would be nice to have better "anemone" type flowers among the Africans. It would also be fine to have some studies made of finer singles in the African types and to see what else could be done to restore the quilling, which was common long, long ago and is seen now perhaps only in Mayling and Honeycomb.

Verschaffelt's Nouvelle Iconographie Des Camellias

GEORGE GRAVES

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The present revival of interest in camellias has caused a searching of the literature of a century or more ago. One old publication that is now being taken down from library shelves, dusted off and pored over is the collated series of monthly fascicles issued by the famous nursery concern of Verschaffelt in Ghent during the years 1848-1860 inclusive, 13 volumes in all. The text of this series has recently been republished in literal translation and a new arrangement by E. A. McIlhenny. The present study was suggested by Dr. H. Harold Hume and made from examination of the sets in the libraries of the Massachusetts Horticultural Society (12 volumes) and the Arnold Arboretum (13 volumes).

The *Nouvelle Iconographie des Camellias* was initiated by Alexandre Verschaffelt in whose establishment was to be found growing one of the most extensive collections of camellia varieties of the time. His approach to the subject was stated in quotation marks in the "Avant-Propos" of Tome I, 1848-1849, as follows: :

"Le Camellia par l'élégance de son port, la persistance de son beau feuillage, la grandeur et le brillant coloris de ses fleurs, a su faire la conquête de tous les amateurs de belles plantes. Il règne aujourd'hui presque en despote dans toutes les collections, dont il fait le principal ornement. Il récréé l'anthophile le plus blasé sur les jouissances horticoles; les Dames le recherchent pour ajouter à leur parure; et ses fleurs du blanc le plus éblouissant, du rose le plus gai, du rouge le plus splendide, ou

mélangées de ces diverses couleurs, accompagnent ou animent leur teint d'une façon ravissante. Point de bouquet sans Camellias; point de tableau de fleurs sans lui. Le Camellia, en un mot, est indispensable pour tout et partout."

The quotation was from a prospectus which the text of the "Avant-Propos" suggests was circulated before publication.

These high-sounding words have in them a large portion of sales talk. It appears evident that there was a commercial aim in publishing colored illustrations together with historical and descriptive essays. The house of Verschaffelt, which Alexandre had founded in 1825, had camellias to sell as well as to look at and to write about.

That the series was intended to circulate among potential customers was suggested in one of the rare references to it in the contemporary garden literature. On March 22, 1850, F. R. Horner of Hull, England, wrote to *The Florist and Garden Miscellany*, calling the attention of its readers to the illustrated work on camellias then being published by "Mr. Alexander Verschaffelt of Ghent," not knowing that Alexandre Verschaffelt had died ten days before. Among other things, Dr. Horner pointed out that: "As Mr. Verschaffelt possesses, perhaps, every known variety of this flower, he necessarily has the opportunity of bringing out such a work as none other could have. Also, the amateur is hereby enabled to make his selection as well as if he were at the trouble and expense



The Verschaffelt establishment as it was pictured in L'Illustration Horticole in December 1854

of making a personal inspection." This notice may have had about it an element of exchanging favors because Alexandre Verschaffelt had the year before named a variety of camellia for Dr. Horner—Docteur Horner (Liv. 8, Pl. IV, 1849).

Little or no notice was taken of Verschaffelt's publication by the horticultural press. Years later, in 1886, the obituary notices of Ambroise Verschaffelt, the son who took over the business and the camellia publication when his father died, made no mention of the *Nouvelle Iconographie des Camellias* when recounting the contributions which the younger Verschaffelt had made to horticulture. It was the custom of the time not to review works that came out in parts over a long period.

A realistic statement of the purpose of the series is found in the essay on the variety De La Reine (Liv. 1, Pl. III, 1854), evidently inspired, if not actually written by Ambroise Verschaffelt. The aim was stated to be the

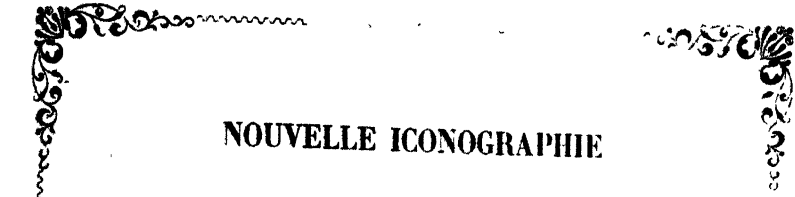
making known of worthwhile new varieties and the keeping alive of the memory of those of former years.*

The Verschaffelts were genuinely interested in camellias for themselves alone, as witness the expression of hope for the eventual development of a blue-flowered variety, which was written into the essay on the variety Carega Superba (Liv. 1, Pl. I, 1857). Sometimes individual plants in private collections were figured. Even so, a glance at some of the internal evidence to be found in the collated series also supports the suggestion of its sales-literature purpose. Very often, the appearance of a variety in *Nouvelles Iconographie des Camellias* coincided with the offering for sale of that variety. Here are three of numerous plain instances, as translated by Mr. McIlhenny.

JACKSONII (Liv. 2, Pl. I, 1849.)

"Beginning in March 1849 we will

* "La *Nouvelle Iconographie des Camellias* faillirait à son but, celui de faire connaître d'abord les plus méritantes nouveautés, et en outre de perpétuer le souvenir de ce que les années antérieures ont vu surgir de plus beau."



NOUVELLE ICONOGRAPHIE

DES CAMELLIAS

CONTENANT

LES FIGURES ET LA DESCRIPTION

DES PLUS RARES, DES PLUS NOUVELLES ET DES PLUS BELLES
VARIÉTÉS DE CE GENRE.

TOME I. — 1848-1849.

GAND,
CHEZ L'ÉDITEUR ALEXANDRE VERSCHAFFELT,
HORTICULTEUR, RUE DU CHAUME, 20

Title page of the first volume of the Nouvelle Iconographie des Camellias

put it for sale. We have decided to keep the same prices at which Mr. Jackson intended to sell his plants, which are included in the following classes:

Plants from 15 to 25 cm. in height,
75 francs.

Plants from 35 to 50 cm. in height,
125 francs."

EMILIANA ALBA (Liv. 4, Pl. III,
1849.)

"We are now able to furnish strong plants of this pretty camellia which is not to be found in many collections."

JENNY LIND (Liv. 12, Pl. II, 1855.)

"As we have immediately ordered a large number of specimen plants, we shall be able to offer them for sale to amateurs at the same time as the holder; that is, next fall (1856)."

The scheme of publication which Alexandre Verschaffelt had in mind was stated, evidently, in the prospectus referred to and quoted from in the "Avant-Propos." If such a prospectus existed, no copy of it was available for this study. However, Dr. Horner, who must have seen a copy of some such publication, stated in his 1850 communication to *The Florist and Garden Miscellany* that:

"It is published in monthly issues, each number containing four plates of camellias, with descriptive letterpress; twelve numbers forming the yearly half-volume, while twenty-four numbers, or the numbers of two years, constitute the volume. The work will be completed in five volumes; it being proposed to give plates of 500 of the most beautiful, or new, or perfect kinds of camellias. . . . One entire volume is now completed; the monthly parts (something less than two shillings per part) are forwarded by the editor,

free of charge, to any subscriber in England."

As Dr. Horner stated, publication got under way in 1848. The title page of Tome I is reproduced in an accompanying illustration.

Even though the evident intention was to have a tome or volume include two years' publication of monthly livraisons or parts (not books), an index was included from the start with each yearly half-volume. This fact accounts for the present-day attitude that each year's issues taken together constitute a volume, of which there are 13. Apparently, the younger Verschaffelt looked at it that way, too, because title pages for one year only began not later than 1851.

Accompanying Plate 378 in Volume X of *L'Illustration Horticole* (1863) is an advertisement offering the complete work, which, the advertisement states, had terminated publication in 1860. Twelve volumes, each containing 48 plates were offered.* This statement about completion in 1860 was evidently made with some license because Livraison 8, Plate I, 1860, of *Nouvelle Iconographie des Camellias* mentions the flowering of a plant of the variety Professore Giovanni Santerelli in 1861.†

The *L'Illustration Horticole* advertisement of 1863 mentioning 12 volumes recalls the fact that sets in some libraries contain 12 yearly volumes and others have 13 and that references to the work in bibliographies may mention either 12 or 13 volumes. In cases where only 12 volumes are present, it is the one for 1848 that is missing. The fact that no consecutive paging was done and no comprehensive index made at the conclusion of publication has made the shortage of a

*"Douze volumes in -4°, compose chacun de 48 planches."

†"—et cette année encore (1861)."



The house of Verschaffelt valued this Camellia so highly that it was chosen to bear the family name

year's fascicles not readily noticeable.

The only general index of the work which has been long available is that given by Edouard Morren and Andre De Vos in their *Index Bibliographique de l'Hortus Belgicus*, which is available in larger libraries. Morren and De Vos did not include the 1848 plates in their indexing and their foreword refers to the work as a whole as being made up of 12 volumes with no fewer than 576 varieties.* It may have been that demand for the work was greatly increased and to meet this, the print order was increased, leaving a number of sets short the 1848 plates.

Still further evidence that the set which Verschaffelt was offering in 1863 lacked the 1848 volume was his statement that each volume contained 48 plates. The first or 1848 volume contains but 47 plates. Plate IV of Livraison 10 is missing. A likely explanation for this gap is that the plate of the variety Anna Zucchini in the same livraison was double the normal size. Thus, the complete work of 13 volumes contains 623 plates, together with descriptions. This does not mean that 623 different camellias are dealt with. There is some duplication.

The contents of the 1848 volume precisely as listed in its index are:

Adelaïde
Alba imbricata (Low.)
— lutescens
Alcina
Alexina (Low.)
Alfida
Anna Zucchini
Augustina superba
Aulica (Loddiges)
Barnii
Brillante (alba briantea)
Cécile de Valtange
Cantifolia (Low.)
Clymène

Commensa
Coquettii
Duc de Brétagne
Chartres
Elegans chandlerii
Emelie Gavazzii
Emilia Campioni
Estherii
Frezzolini
Général Lafayette
Grandis (Low.)
Guthriana
Hendersonii
Henri Favre
Il Roberti
Jubilée (Low.)
Leda
Lord Peel
Maria-Theresa
Marie Morren
Miniata (Low.)
Mistriss abby Wilder
Nymphaeiflora
Prince Albert
— de Canino
Princesse Mathilde
Radiata vera
Reine des fleurs
Squamosa alba
Stockwelliana
Sulcata
Varishii
Wasingtonii

The 1848 plate of the General Lafayette was made from a picture sent by Boll "of Philadelphia" (D. Boll's correct address was Forty-Sixth Street, New York). Later, in 1853, a new plate of the same variety drawn from living material, and presumably more accurate, was published.

Plate IV of Livraison 12, 1848, very much resembles Plate 154 of *Annales de Gand* Volume III, 1847, even to the spelling of the name Maria Morren. It was a variety originated by H. Haquin of Ghent. Apparently the same Haquin seedling was being dealt with

*"—en 12 volumes, pas moins de 576 variétés différentes."

in Plate III of Livraison 6, 1853, but in a new plate and under the name of Marie Morren. Likewise, "Mistriss Abby Wilder" appears in both the 1848 and the 1853 volumes but with different plates.

The variety Duc de Chartres is figured in Plate IV of Livraison 1, 1848, and is again similarly described but figured differently along with the variety Comte de Paris in Livraison 6, Plate III, 1852. There is a suspicious similarity between the Emilia Campione of the 1848 volume and the Emilia Campioni of 1854. The "Maria-Theresa" of the 1848 index refers to the "Marie Thérèse" of the text (Liv. 1, Pl. I), and is a different plate from that of the Marie-Thérèse figured in Livraison 9, Plate II, 1852, although whether two varieties are involved is not made plain by the text.

An occasional discrepancy occurs in the 1848 volume between a name over a text description and that on a plate or in the index, as for instance, Alcinia Rosea and Alcina, Estherii and Estheri, and Washingtonii, Washingtoni and Wasingtonii. Errors of this kind are common throughout the work. However, errors in the text were sometimes corrected. There was an erratum note pasted to the essay on Commensa (Liv. 6, Pl. II, 1848) after printing, restoring origination credit to "Donkelaar."

Originators, when known, or introducers, as well as country of origin, were rather accurately dealt with in the text. A note of correction added to Livraison 8, Plate I, 1859, explained that a plate and description previously published as Paolina Maggi (Liv. 5, Pl. I, 1859) should have been labelled Carolina Franzini. Likewise, those published as Carolina Franzini (Liv. 7, Pl. II, 1859) should have been labelled Margherita Coleoni. A figure of the true Paolina Maggi was promis-



Ambroise Verschaffelt photographed from Scheerlinck's "De Azalea indica L." (Tuinbouw Encyclopedie I)

ed in one of the next numbers, but failed to appear.

A preponderance of the varieties dealt with were of Italian origin because at the time, Italy was a prolific source of new camellia varieties. The compilers seemed to have had a strong leaning towards a fully double flower which is no longer as popular at it once was. In fact, few of the varieties included in the series are now in cultivation, thus making the whole work largely of antiquarian or historical interest. Comparison of camellia blooms of today with plates in *Nouvelle Iconographie des Camellias* for identification purposes is of doubtful value.

The pictures were painted either from plants in Verschaffelt's own collection or, as in the case of Alba Lutescens (Liv. 4, Pl. III, 1848), in other camellia collections in the Ghent area. As previously pointed out, in at least one instance, Général Lafayette (Liv.

10, Pl. III, 1848), Verschaffelt reproduced a drawing supplied by someone else.

As stated before, the publication was started by Alexandre Verschaffelt in 1848. He died March 12, 1850, after a long illness. The subscribers received notice from Ambroise Verschaffelt dated March 24, 1850, stating that he intended to carry on in his father's place. In fact, the statement in the death notice that: "Je vais continuer avec le même zèle et la même exactitude que par le passé, et qui était, du reste, confié à mes soins exclusifs" could be taken to mean that the management of the publication had been turned over to the son before the death of the father.

Beginning with 1851, the name of Ambroise Verschaffelt appeared on the title page as "editeur." The title page of the 1852 volume lists Ambroise Verschaffelt as "editeur" but the colored jacket for the January number of the same year gives the credit to "Ambroise Verschaffelt, Fils." The latter form was carried through on all subsequent title pages. It could, therefore, be assumed that a member of a third generation of the Verschaffelt family took over in 1852. However, the contemporary literature makes no mention of such a person. Apparently, Ambroise Verschaffelt carried on the business of his father until the beginning of 1870, together with his own venture of publishing *L'Illustration Horticole*, which was established in 1854. Linden then took over the nursery business and brought in Edouard André to act as editor of the magazine in place of Lemaire. Part of the inherited business was the completion of the *Nouvelle Iconographie des Camellias*. It would appear that having the same initial as his father Ambroise Verschaffelt tried to clarify the situation

by designating himself as the son and succeeded only in causing more confusion.

This belief that Ambroise Verschaffelt and Ambroise Verschaffelt, Fils were one and the same person is borne out by the fact that the masthead of *L'Illustration Horticole* continued to credit Ambroise Verschaffelt with the title of "Editeur" of the *Nouvelle Iconographie des Camellias* long after the latter publication had been completed. Also, the 1863 advertisement previously mentioned contains the statement that the camellia series was "Éditée par Ambr. Verschaffelt, à Gand." The conclusion of this study is that but two Verschaffelts were concerned with the work—Alexandre and his son Ambroise. Of the two men, Ambroise seems to have made the greater contribution, not only because of longer association but because the later volumes bear evidence of better scholarship.

There is confusion, too, as to who wrote the text of the series. A study of the "Avant-Propos," which is in two parts, strongly suggests that Alexandre Verschaffelt wrote the first part of the foreword of the 1848 volume. The second part was signed by Auguste Van Geert, a Ghent nurseryman well qualified to discuss the culture of camellias. There is no evidence that Van Geert was author of any more of the text than the part to which his name is signed.

A number of essays in the 1848 volume refer to Alexandre Verschaffelt in such a manner as to suggest that the text was written by someone else. For example, it is stated of the variety *Aulica* (Liv. 8, Pl. I, 1848) that: "It bloomed at the exposition last March in M. Alex. Verschaffelt's collection of 15 new camellias." References in the same manner were made in the

discussions of Clymene (Liv. 6, Pl. I, 1848) and Alcinia Rosea (Liv. 4, Pl. I, 1848). The essay on the variety Radiata (Liv. 7, Pl. III, 1848) states: "We have asked M. Verschaffelt for some information about this camellia." This statement would seem to make it certain that Alexandre Verschaffelt did not write that particular description. Nor did he write (Duc de Bretagne Liv. 3, Pl. III, 1848): "The drawing which we reproduce was made from a plant that bloomed in the home of M. Alexandre Verschaffelt, and who has put it at our disposal to reproduce here; we take advantage of this occasion to express to him our deep gratitude."

Although there is no evidence in the work to support the claim. Morren and De Vos list Charles Lemaire as "rédacteur principal" of the *Nouvelle Iconographie des Camellias* and credit Lemaire with authorship of the descriptions in the individual listings of varieties from the beginning of 1849

on. It could well have been true that Lemaire was ghost writer for Ambroise Verschaffelt because the two men were associated as editor and publisher of *L'Illustration Horticole*. It could be assumed, however, that the commercial offerings in connection with some of the descriptions were doubtless the expressions of Verschaffelt the nurseryman. There is evidence, too, that Ambroise Verschaffelt's active work on the publication went deeper. The note on the Paolina Maggi mixup previously referred to is signed "A.V."

With the evidence supplied by the work alone, it would appear that the Verschaffelts, father and son, planned the book, watched over the preparation of the plates and text and took the risk as publisher. Who actually did the work is not recorded, except in the case of the artists who made the plates, but because of the close association between Verschaffelt and Lemaire, it is reasonable to believe the latter had a part in the editorship.

Disease-Resistant and Hardy Varieties of Vegetables

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In this fifth and last installment of the article of the above title a group of miscellaneous crops is considered: Lettuce, peas, root crops, and spinach. They are grouped together in this final article for no better reason than that they did not seem to fit in well with crops discussed in earlier articles.

Lettuce

Lettuce is distinctly a cool season crop that will stand frost or *light* freezing but not hard or continued freezing. The problem in extending its range of culture is largely the development of "hardiness" to warmer temperatures than are suitable for growing most varieties. Although lettuce is grown in a more or less perfunctory fashion in home gardens everywhere in the country, at some season or another, its extensive commercial culture is concentrated in a few areas and districts having especially favorable cool growing seasons. Unfortunately, lettuce varieties possess rather highly specific climatic requirements so that very few are adapted to a wide range of conditions. In no crop is the careful choice of variety to suit a given set of conditions more important.

In the last 15 years several so-called "heat-resistant" varieties have been introduced by both private and public agencies, and a substantial amount of breeding work toward that end is still in progress. The heading varieties are notoriously sensitive to temperature, few amateur gardeners realizing that this may be the reason why they can not grow good head lettuce in their

own localities. In many western districts disease has necessitated the production of resistant sorts.

The western lettuce shipping industry was built on the variety New York (or Wonderful) erroneously called Iceberg in the vegetable markets. About 25 years ago it became evident that the New York was too sensitive to heat and to certain diseases to permit profitable culture in many districts where growers wanted to produce it. Two of the earliest improvements of this variety were strains known as New York No. 12 and New York 41 developed by commercial seedsmen for some tolerance to higher temperature in the West. New York No. 12 is still grown to some extent but is not adapted to really hot weather or to the East. Since 1930 the United States Department of Agriculture and cooperating agencies in California have produced a large number of strains of New York type having special adaptations to different seasonal conditions and resistance to brown blight, or to brown blight and mildew. Most of this series of improvements bear the name Imperial together with a letter or number.

Imperial D is a winter strain adapted to the West and resistant to both diseases mentioned. Imperial strains identified by numbers are resistant to brown blight but not to mildew, and generally are best adapted to the West and Southwest. Among the most important of these are Imperial 152, Imperial 615, Imperial 847, and Imperial 850. More recently, the Experiment Stations of Michigan and of Cornell

University in cooperation with the Federal department have introduced three varieties of New York type that are much more resistant to tipburn (heat damage) and which will make more solid heads in the East than the above-named strains. Imperial 44 and Imperial 456 have been fairly good in the Northeastern States, while another variety, Great Lakes, has attracted attention in the States around the Great Lakes. Although these are somewhat tolerant of warm weather none of them do well in the summer heat of the warmer parts of the country. Great Lakes has been found very good in the summer lettuce districts of California, and Imperial 847 is grown to some extent as a winter lettuce in Florida. Nearly all the commercial lettuce of this country is made up of these New York and Imperial strains mentioned here.

Investigators are striving for still more heat tolerance—head varieties that can be grown more successfully in the eastern and middle parts of the country. The United States Department of Agriculture has introduced a number of new types designed for the Middle Atlantic States. They show some improvement but have been grown to only a limited extent and are not, as yet, commonly listed by seedsmen. Of these Cosberg is best known but is of temporary interest since it doubtless will be superseded by substantially better sorts in a few years.

The Massachusetts Experiment Station developed a downy-mildew-resistant head lettuce called Bel-May, for greenhouse culture.

There are a number of old varieties having a fair amount of sturdiness and merit for the home garden but these cannot compete commercially with the New York Type. The little Mignonne is one of the surest to head,

but many people do not care for its small size. Varieties of the Cos or Romaine type generally are more tolerant to heat than either the crisp or butterhead varieties. They have been used to good advantage as parents in breeding heat-tolerant head types. Probably the best known of the Cos varieties in this country is Paris White or Trianon.

Generally speaking, leaf varieties of lettuce can be grown at some season of the year in places where good results can not be obtained with head lettuce. Black-Seeded Simpson, Early Curled Simpson, and Grand Rapids are the best known. They all have curly, pure green, leaves. Grand Rapids strains, however, generally are harder to germinate in very warm soil than are the others. The Ohio Agricultural Experiment Station developed a strain known as Grand Rapids Tip Burn Resistant. The United States Department of Agriculture developed a strain of Grand Rapids with a measure of mildew resistance, known as Grand Rapids U. S. No. 1. A curly, red-leaved variety, mis-named Prize Head, is another fairly popular leaf sort for home gardens.

The most striking lettuce introduction in many years is a very curly, very long-standing, heat-tolerant leaf type named Slobolt. It "bolts" to seed 2 to 4 weeks later than other leafy kinds and actually tolerates relatively hot weather. It has even been grown with fair success on many tropical islands, during the war, where all other lettuces tried were virtual failures. It will be generally available from seedmen for the first time in 1946. Slobolt was produced by the United States Department of Agriculture.

Peas

Peas (English, or garden), somewhat like lettuce, are sensitive to high temperature. They can be grown in

the coolest regions in which any vegetable crop can be grown in this country. Both quality and yields are seriously impaired by hot weather, particularly if it is dry. The crop also falls prey to a long list of diseases. Since the pea is one of the most important commercial, as well as home garden, vegetables it has been the object of an enormous amount of breeding and improvement work. Probably no other crop surpasses it in the trueness, uniformity, and general excellence of seed stocks available to growers. In the past 20 to 25 years the American seed industry has accomplished truly commendable results.

Since 1925 scores of fusarium-wilt-resistant varieties of peas have been produced, or old partly resistant varieties have had fusarium-susceptible individuals eliminated from them. Today a majority of the varieties sold in the United States of America and the greater proportion of pea seed planted are wilt resistant. Some of the more important ones for home and market gardens are listed here because seed catalogs often do not indicate whether a variety is resistant or susceptible. (1) Smooth-seeded peas: Alaska, White Marrowfat, some strains of First and Best. (2) Wrinkled-seeded peas: Alderman and Dwarf Alderman, Dwarf Telephone (Daisy), Everbearing, Gilbo, Glacier, Morse Progress, Morse Market, Number 40, Prince of Wales, Improved Stratagem, and Giant Stride. Most of the edible podded varieties available are wilt resistant, as are the principal canning varieties like Perfection, Pride, Resistant Surprise, and others.

Although fusarium wilt is the only pea disease against which highly resistant varieties have been developed there are small to moderate differences in susceptibility to a number of other

troubles, such as root rot, *Ascochyta-Mycosphaerella* blight, near wilt, and certain mosaics. The following varieties have shown some probable superiority over others with respect to the several disorders named: (1) Near wilt and wilt: Delwiche Commando. (2) Common pea mosaic: Hundredfold, Laxton Superb, Little Marvel, Morse Market, Perfection, Surprise, Thomas Laxton. (3) Septoria leaf spot: Perfection is tolerant. Perfection also is resistant to a half dozen virus troubles; and Little Marvel, Surprise, and Wisconsin Early Sweet are resistant to five different viruses.

It is common knowledge that the hardiness of peas permits their being planted very early in the spring, or in winter in the South. While they will germinate in relatively cold soil and the young plants will tolerate some frost, ice, and snow they do not stand much hard freezing. Furthermore, it is only the stems and leaves that tolerate any degree of freezing. As yet no variety of garden pea has been found that can stand freezing of its blossoms or pods. The greatest hardiness to cold is required of varieties to be grown during the winter in those parts of the South where untimely hard freezes occur occasionally. Willett Wonder, a smooth pea, similar to First and Best, has shown significant hardiness to cold. A surprising degree of cold resistance has been found in Wando, a new wrinkled pea developed at the U. S. Regional Vegetable Breeding Laboratory at Charleston, South Carolina. The leaves and stems of this variety have survived temperatures of 15° to 17° F. in the field when all other named varieties were killed. Hard freezes that occurred when Wando was in bloom or pod destroyed the blooms and pods only to have later ones form and make a fair crop, while other peas were com-

plete failures. This pea, although developed originally for cold resistance, seems also to show more heat tolerance than most others and promises to be the hardiest high quality pea grown in this country to date. Experience with it so far indicates that it is highly productive, of high eating quality, and excellent for canning and freezing preservation as well as fresh use.

Alaska and other very early peas, when planted very early in the spring, largely escape hot weather by virtue of their quick development. When planted late, however, they suffer seriously from heat in all but the cooler parts of the country. Austrian Winter is a very hardy pea, but it is a colored field pea grown for soil improving and soil conserving purposes, and not for food.

Root Crops

In this section reference will be made to beets, carrots, parsnip, radish, rutabaga, and turnip.

Beets. Despite the scores of names of beet varieties that appear in American seed catalogs there are hardly a dozen distinct important forms. There are marked differences in color and shape of root, color and size of leaf, and some differences in rate of growth or development. Except insofar as rate of attaining the desired size (earliness) has a bearing on choice of variety for short or cool seasons, there is little to be said concerning "hardiness." None of the present varieties thrive during midsummer in the warmer parts of the country, although fall crops can be started while summer temperatures are fairly high.

All beet varieties are normally hardy to frost and light freezing. They can be planted well before the last spring frosts and can stand in the garden until fairly hard freezes threaten to occur in the fall. Prolonged exposure

to very cool weather before a period of good growth sometimes induces premature flower stalk formation thus interfering with normal root development. No accurate data are at hand to indicate any substantial differences in this regard among garden varieties, although differences may exist.

The "earliest" varieties (55 to 60 days) are Early Flat Egyptian, Crosby Egyptian, and Early Wonder and its related strains. Although Detroit Dark Red, Crimson Globe, and Early Blood Turnip will produce about the same yield of roots in equal time. The point is that the three varieties last named are normally allowed to grow somewhat larger than the others before they attain their ideal shape, but are only about a week "later." They retain good quality up to somewhat larger size than the early sorts. The long and half-long types, including Long Smooth Blood, New Century, and Winter Keeper, require substantially longer to attain their optimum size (75 to 80 days) so are likely to encounter adverse hot weather in the warmer parts of the country when planted in the spring. Thus, if only a very short season is available before encountering either hot or cold weather the flat or round types are preferred to the long and half-long.

Although garden beets are subject to a number of diseases, only curly top has seriously limited their culture for feed. Curly top is a virus disease that is prevalent in the Inter-Mountain area and elsewhere in the West. Breeding work is in progress to develop a curly top resistant table beet by crossing table beet with resistant sugar beet. Success appears quite possible but has not yet been attained.

Carrots. What has been said above regarding the hardiness and climatic adaptations of beets applies in a general

way also to carrot varieties, although carrots appear to tolerate a little more heat than beets after they are well along in their development. It is usually difficult to get good stands of carrots in hot weather. Also carrots develop poorly in very heavy stony, or dry soils; this is especially true of the longer, later varieties. They are not "hardy" to adverse soils.

The earliest and shortest carrot is French Forcing; the root is only about $2\frac{1}{4}$ inches long and nearly as thick, requiring about 60 days to develop. Early Scarlet Horn has a root about $3\frac{1}{2}$ inches long and requires about 65 days. Under adverse soil conditions and very short season one or the other of these would have a better chance to produce a good carrot than would the longer and later, generally more desirable, varieties. Chantenay, Red Cored Chantenay, and Danvers Half Long (72 to 75 days), are good home garden and general purpose sorts, and are more widely adapted than the Imperator and Morse Bunching (about 80 days) which are so very extensively grown in the West for shipping to market.

There are no marked superiorities among carrot varieties in tolerance or resistance to disease, and unfortunately no very extensive efforts are known to be in progress now to develop disease resistance.

Parsnips. The parsnip is a minor crop that has received very little attention from plant breeders. The commonly grown long type (Hollow Crown or Guernsey) does best in cool climates, but requires 3 months or more to reach a usable stage. There is, however, a less commonly grown short, thick variety called Short Thick that becomes usable in about 75 days. For seasons too short for the long type, or under soil conditions not suited to deep

root development Short Thick may have advantages.

There are no known varietal differences in susceptibility to disease among parsnips.

Radishes. Radish varieties exhibit an extreme array of size, color, shape, and rate of development all the way from the little red or white globes—ready to eat as soon as three weeks from planting—to the large, long, winter types that may be harvested in the fall 3 months after planting. The radish is moderately hardy, will stand frost and light freezes but not hard ones, and does not thrive in very hot weather. Heat impairs its quality. Thus, in those regions that warm up quickly in the spring only early sorts are adapted to spring planting, such as Saxa, Early Scarlet Globe, Sparkler, French Breakfast, Long Scarlet (Cincinnati Market), White Icicle, and others that develop in less than 30 days.

Among these early radishes the small round or oval varieties do better under difficult soil conditions than do the long varieties like Cincinnati Market and White Icicle. The long ones frequently are more subject to malformations, discolorations, and even injury by pests in the soil than are the early round ones that develop at the very soil surface. It can hardly be said that the small round radishes are substantially "hardier" than the long ones, or that they are insect or disease resistant. They apparently simply escape certain hazards because of their growth habit.

Americans generally care little for the large, late, "summer" or winter radishes, such as Long Black Spanish, Round Black Spanish, China Rose, Chinese White Winter, and Half Long Gray, which normally reach harvest stage in 50 to 60 days. The flesh is very firm, generally very pungent, and the roots will stand for a considerable

time in the cold (not freezing) soil of fall without deterioration. These varieties are quite hardy in that they can be stored successfully like other root crops for several months. Those who want a sprightly radish flavor for salads in the winter when none can be grown may find some of these attractive. They are suitable for spring planting only in the North.

There are no "disease resistant" radishes, strictly speaking, but the very small, very early varieties escape various kinds of damage better than the others because of their habit and rate of growth.

Turnips. The turnip is another cool weather root crop that is reasonably hardy to light freezing but which is definitely harmed by hot and dry weather. Garden varieties range from 40 to 70 days in time required to reach good usable size and certain stock-feed varieties need up to about 80 days. In adapting varieties to seasonal conditions the same reasoning should govern as outlined above for radishes.

Snowball, White Milan, and Purple Top Milan are among the earliest varieties (about 45 days to usable size). Purple Top Globe, the most popular variety, and White Egg require about 60 days to best size. All these are flat, globular or oval varieties. Golden Ball is a yellow fleshed turnip (not a rutabaga) which takes about 65 days to full size.

Shogoin, a Japanese variety of turnip, is of special interest for quick production of greens. In late summer or early fall, good greens can be harvested in 30 days. An outstanding characteristic is that it is somewhat less susceptible to injury by aphids than are other varieties. It also produces small white roots of good quality, but they are of secondary value. For spring culture it must be planted very early since it is not heat tolerant. A Scotch variety,

the Bruce, not grown in America, is reported to be resistant to club root, a slime mold disease that affects members of the cabbage family.

Seven Top, a greens turnip that forms no enlarged root, is early, hardy, and (according to limited records) considerably less susceptible to bacterial soft rot than other varieties.

Rutabaga. Rutabagas or Swede turnips are little grown in the United States except in the northern States because they are sensitive to heat and require 90 days to make a crop. There are no notable differences in hardiness or climatic adaptations among the few varieties grown here, but some interesting differences in susceptibility to certain diseases have been observed. Most varieties are very susceptible to bacterial soft rot (*Bacillus carotovorus*). Limited observations have indicated the following varieties to be considerably less susceptible: American Garden White, Laurentian, Neckless Yellow Bronze Top, Sweet Perfection White, and certain strains of Sweet German.

Spinach

Spinach is one of the very hardiest annual plants grown in our gardens. It is quite commonly over-wintered in the field or garden on the Pacific Coast and in the Middle Atlantic Coast regions and southward without any protection. In colder places some litter or straw covering is needed, but it will survive temperatures of 10° F. or even lower, for short periods, without cover, when a fourth to a third grown. Younger plants may be "heaved out" by alternate freezing and thawing, while large plants will be damaged by the cold or by excessive drying.

For early fall planting to be harvested in the late fall or for late fall planting for over-wintering, there are two outstandingly hardy and disease resistant varieties: Virginia Savoy and

Old Dominion. Both were developed at the Virginia Truck Experiment Station. Virginia Savoy was developed about 25 years ago by selection from a hybrid between the ordinary cultivated spinach and a wild type imported from Manchuria. Old Dominion was introduced in 1930 from a cross between Virginia Savoy and King of Denmark. These resistant kinds stand more cold than other varieties and are relatively unharmed by spinach mosaic, popularly called "blight" in the Atlantic Coastal areas where it damages other varieties. Neither of these varieties should be planted in late winter or in the spring because they shoot to seed quickly.

For spring planting there is a long list of varieties ranging from the various improved strains of the Bloomsdale type (38 to 40 days) through Nobel and King of Denmark to Juliana (about 50 days). For regions that warm up quickly in the spring the early varieties are best since they develop quickly and are harvested before hot weather. Generally speaking, they are best for home and market gardeners because of their wider adaptability.

True spinach is very sensitive to hot

weather but New Zealand spinach—which isn't spinach at all—thrives in hot weather, and is killed by frost. For those who want a hot weather greens with eating qualities similar to spinach, it is worth consideration.

The term Perpetual Spinach is sometimes erroneously applied to Swiss Chard, a leafy form of beet that is one of the best heat-hardy greens. Although it cannot stand midsummer temperatures in the warmest regions it can be grown successfully clear through the summer over a large part of the country. All varieties are essentially similar in adaptability or hardiness.

Conclusion

As never before, the plant breeders are producing new and improved varieties with greater resistance to cold, to heat, to disease, and to a lesser extent to insects, but there is usually a few years' lag between introduction and general availability. If gardeners and growers can be better informed of research progress, and will ask their seedsmen for these new things as they appear, their early availability to the public will be expedited and earlier benefits obtained.

Hybrid Clivias for Distinction and Beauty

KARL WALTER OPITZ

To delight lovers of fine plants, new improved strains of *Clivia miniata* of the family *Amarillidaceae* are making their appearance in an increasing number of Southern California gardens. Until recently it was thought that *Clivias* must be grown in pots under glass. But now it has been demonstrated that the plants do excellently in well prepared beds out-of-doors under full shade. These aristocrats of color and form are destined to become a

prominent feature in frost-free localities.

The new broad-leaved types are much superior in both foliage and flower color to the old South African Kafir Lily. English and Belgian and now American horticulturists have cross-bred and selected until the species can hardly be recognized in the parents. Unbelievably broad, deep green, heavy, blunt, waxy, strap-shaped leaves in well-grown clumps give the im-

*Edwin T. Merchant**Hybrid Clivias*

pression of superlative health and vigor. Under favorable conditions the plants attain a height of two feet or more and the leaves are four inches broad.

Umbels from six to eight inches across and of from twelve to twenty broadly funnel shaped flowers are borne on stout peduncles which are thrust above the gracefully curving

leaves like a brilliant crown. Depending on the number of mature offshoots, large plants bear two to five flower clusters in one season. Mature single plants produce but one umbel per year. Individual plants vary in flower color, the usual color being orange-scarlet with a pale yellow or white, tinged green, throat. A growing number of shades ranging from a rich full colored wine-red to white segments tipped pale orange may be found. With correct nutrition the flower segments (petals and sepals) measure up to three inches in length. Time of blooming depends upon the nutrition of the plant, temperature, and light conditions. The height of the blooming period is usually in March or April. Prolonged periods of dark, cool, moist weather followed by warm, bright days may force an early bloom. The time the first flower in a single cluster is open until they are all finished may amount to six or eight weeks. Usually, however, with favorable weather the entire inflorescence bursts into bloom and lasts for three or four weeks. There is hardly a more breath taking spectacle than a large bed of *Clivia* hybrids in full bloom. Thriving as they do in deep shade and displaying such a wealth of dark green foliage, the brilliant flowers literally blaze with color.

If cut while the stalks are turgid with water in the morning, the flowers in full bloom last for ten days to two weeks under ordinary room conditions when placed at once in a vase of water. Cutting the undeveloped flower cluster is unsatisfactory because unopened buds do not size up well in flower.

Adequate pollination by insects is not ordinarily attained. Thus, in order to assure seed production, it is necessary to hand pollinate. This is a simple matter because the flowers are large and the pistil and stamens conspicuous.

Pollen is produced in great abundance.

The developing fruits are quite attractive. As the berries mature they change from deep green to bright red. With a good set of fruit the old flower stalk looks like a stout club with fingers abruptly set with huge red cherries. It takes about nine months for the seed to mature on the plant.

Plants come remarkably true to seed thereby facilitating easy selection of the best types for propagation. The seeds germinate readily if planted when mature and not allowed to dry out. They are often planted in a good potting mix lightly covered with sand and peat. The small plants can be transferred to three inch pots in about four months.

In comparison with most plants growth is slow. It requires about four to six years to obtain blooming plants from seed. But plants of flowering size soon produce offshoots which, if left with the parent, may bloom within three years. When the clusters crowd excessively they should be carefully divided. The so-called "bulb" is merely the thickened leaf bases, and in replanting should never be allowed to become covered with soil. Well rooted divisions may be set directly in beds about two feet apart each way. Poorly rooted offshoots or bulbs that have lost their roots are best treated as cuttings since vigorous root production is easily obtained in sand and the plant can then be re-established in pots or beds with little danger of bulb rot. *Clivias* bloom best when undisturbed. Hence, it is only when excessive crowding causes nutritional inhibition or interferes with proper air circulation and thereby permitting fungus and insect pests to thrive that division is warranted.

For the largest blooms the plants should be provided with sufficient nutrients to assure good growth during the period prior to initiation of flowers.

Immediate to the blooming period it is well to feed with liquid manure. After flowering all necessary replanting or repotting should be taken care of. Vigorous growth is best maintained until late fall. Then a short period of semi-dormancy is induced by withholding water from the roots. This short rest period tends to insure flowering. Care must be taken, however, not to allow dessication of the plant.

Clivias must have good drainage. Their water requirements are not great, and they are tolerant of rather high concentrations of calcium and other minerals as long as they are well provided with organic matter in the form of peat, compost or manure.

No cultivation should be attempted as the comparatively few, shallow roots are large and fleshy and easily damaged. A mulch of an inch or two of well rotted steer manure, compost, or bean straw will aid in maintaining excellent water absorption and will provide most of the fertilizer needs of the plant.

Wind does not seem to bother the plants when provision is made to make up for excessive water losses. But the flowers do not stand rough treatment; and it is, therefore, best to grow the plants where they are sheltered from strong drafts.

During hot, dry weather an occasional syringing maintains best growth conditions. When the plants are in bloom it is best to avoid wetting the flowers or spotting of the perianth may result. A periodic heavy syringing helps to control mealybug which is fond of Clivias and may build up in great numbers in the axils of the leaves.

As may well be imagined the new hybrids are finding many well shaded frost free gardens to their liking. Clivias combine excellently with plants of a subtropical nature, such as palm, tree

fern, dracena, strelitzia. A carpet of Helxine, when properly cared for, is excellent undercover. The full shade of live oaks, magnolias, avocados, California laurel and a host of other evergreen trees provides an excellent place for beds or clumps of Clivias in a naturalistic setting with other shade loving plants. As potted or boxed specimens in the shady portion of the patio, the Clivia is unexcelled. Where frost is a danger, container grown Clivias are splendid conservatory subjects. As potted plants they are well received by florists especially at Easter time.

From this discussion it is not to be assumed that California is the only place where hybrid Clivias thrive. Emphasis is placed on their adaptability to out-of-door culture because this aspect has been neglected in the past. Glasshouse grown plants, where subtropical conditions do not prevail, are likewise important. Potted or boxed specimens are often taken from the greenhouse when the first buds appear and placed in the home, office, hotel lobbies, hospitals, et cetera, so that the handsome plant and flowers may be enjoyed during the blooming period. After flowering, unless conditions approximating the glasshouse can be provided, it is best to return the Clivias to the conservatory.

As these fine new strains of Clivias become better known they will doubtless find an important place in gardens where they are adapted. And a yet wider range of flower color shall be expected. Perhaps pure white Clivia flowers may sometime surpass the well-known Easter lily for holiday observances. But no matter what the destiny of hybrid Clivias may be, they certainly are among the best of shade plants in year around beauty and distinction.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Aquilegia pinetorum Tidestrom

The notes on *Aquilegia pubescens* by Mrs. Lester Rowntree in the July 1945 number remind me of the first time I saw it while in Yosemite Park. I too was impressed with its majestic beauty. That night in dreaming over the day's exploits, I recalled the columbines I had seen on Cedar Breaks in Utah. The more I thought, the more the two seemed alike. The attendant at the lodge there thought they were native but could not name them.

From appearances of the stand I concluded they were garden hybrids that had reseeded over a course of years. The flowers were a large uniform white with long spurs. When I realized that the altitude of Cedar Breaks and that of Mt. Dana, their habitat in Yosemite, were each approximately 10,000 feet, I had a fantastic thought. Possibly the terrane between the two peaks was once table land and the area between sunk leaving these peaks, and similar ones, as islands perpetuating the species.

I wrote the Park Naturalist, of Cedar Breaks, Mr. Clifford C. Presnall, and he sent me seed naming it *A. pinetorum* Tidestrom and expressed interest in the study. He apologized for delay in forwarding stating that chipmunks seem to harvest them before they get ripe but he had managed to get a few. So the deer are not the only curse of the seed collector as reported by Mrs. Rowntree but also a culprit more numerous. The columbine is a prolific seed producer and also prolific in germination. The lush seed pods thus appear in the animal menu as a help to keep

down extreme multiplication. However, in the scheme of things, the seed collector is often left like a hawk to soar around to spot and pounce upon his prey . . . and the exultation in a find!

The seed readily germinated in pots and was set out in the garden as small plants along side of each other for study. There was no set back or difficulty in taking hold as experienced by Mrs. Rowntree. . . perhaps pure luck. There was little if any comparative study owing to wide differences. After several years both disappeared. Here was a fascinating thought:—two species taken from similar altitudes of about 10,000 feet, some eight hundred miles apart, and brought together to be companions at sea level and a climate not suited to alpiners. . . with our domesticated columbine in the garden as audience.

Regarding related species, ecologically and floristically, it should be recalled, that the altitudinal relationships may differ between two regions. One may find like elevations yet complexion of the flora and terrane is quite different.

Aquilegia pinetorum Tidestrom is a recent discovery. A native of the Great Basin in the vast *Pinus ponderosa* area of Southern Utah and Northern Arizona and ranging in altitude from 10,400 feet to some 6,000 feet whereas *A. pubescens* range in the Sierra Nevada from some 12,000 to 9,000 feet. *A. pinetorum* is white only, resembling the subspecies *albiflora*, and its botanical position is described as appearing to lie between *A. coerulca* and *A. chrysantha*. To the former it is related by its sometimes faintly bluish sepals while



Maxine Williams

Campanula lasiocarpa

the long and very slender spurs are related to the latter.

GEORGE B. FURNISS
Oakland, California

Campanula lasiocarpa

This member of the well known and beloved Bellflower Family is distinguished from the better known *Campanula uniflora* by the sharply-toothed leaves, larger corolla and sharply-toothed calyx-lobes.

It is a small plant, 3-6 inches high, nearly smooth. The leaves grow to 1-¾ inches, the flowers are bright blue, about 1 inch long, with a dark line down the center of each petal, solitary, fragrant. The broadly open bell sways on a short slim stem. The plant grows at high altitudes in poor gravelly soil. It is widely distributed in Northern North America and Northern Asia.

SARAH V. COOMBS

The Mustard Family

The average amateur, observing plants that grow in his garden, is of course able to recognize and name such flowers as Delphinium, Phlox, or Columbines. If, however, he were to see only the seed pods of these plants, and not the flowers, he might have difficulty in determining from what plants these seed vessels were taken: and in this connection, may I suggest that garden clubs could probably spend a pleasant half hour, if members were asked to identify a number of pods of plants, which all present had frequently seen or grown. I suspect that the number of incorrect answers would be quite large.

There is one family of plants whose generic name cannot be recognized solely by a cursory glance at the flowers. That family is the Crucifers, or as

it is commonly called, the Mustard Family. All the flowers are alike in that they have four distinct petals, and six stamens, four long and two short. Often the flowers of different genera belonging to this family are so much alike that we must wait to see the seed pod develop before we can identify them. To this family belong the Wallflowers, Aubrietias, Alyssum, Arabis, Candytuft, Athionema, and a large number of weeds, such as field Mustard, Shepherd's Purse, as well as such wild flowers as Cress and Toothwort.

The reader may possibly challenge this statement by asserting for example, that he can always recognize an *Alyssum saxatile*, or an *Arabis alpina*. However, his recognition of these plants results, to a great extent, from an examination of the leaves, the color of the flower, and the height of the plant. If he were given a single flower of *Alyssum saxatile*, and a single flower of certain yellow *Drabas*, he would probably be puzzled to distinguish one from the other. He might be similarly puzzled if he tried to distinguish between a single flower of a field Mustard and that of a yellow Wallflower.

Anyone who has examined the pod of an *Alyssum* cannot fail to recognize other members of this genus. All of them are small, round to oval, very flat, and the septum enclosing the few seeds is so thin, that generally when holding the pod to the light, the seeds can be seen inside. An *Alyssum saxatile*, and our annual Sweet Alyssum, have pods almost identical in shape, although the former is larger.

The *Drabas* are fairly low growing plants, with either yellow or white flowers. The cultivated ones are seen mostly in the rock garden, although the *Draba* called "Whitlow Grass" is often encountered in our fields. The plants of this genus have short, flat, elliptic



Draba, *Aubretia*
Arabis, *Erysimum*

to linear pods, each pod bearing a fair number of seeds. The picture gives an idea of the size of these pods.

The common Wallflowers usually grown in our borders belong to the genus *Cheiranthus*. However there are somewhat similar species, also called Wall flowers, many of them delightful Rocky Mountain plants, that are placed in the genus *Erysimum*. In either case, the pods are rather long and linear, and often four angled.

It is not our purpose to confuse the reader with a description of the pods of all the different genera. Possibly the article may serve as an introduction to a pleasant study of the Crucifers, enabling the student not only to recognize the family, but also, after the flower has faded, and the seed pod appears, to determine the generic name of the plant.

ROBERT M. SENIOR,
Cincinnati, Ohio.

Rhododendron Notes

CLEMENT G. BOWERS, *Editor*

Rhododendron in the Northwest.

Here on Puget Sound we do not have the extreme in temperature, thanks to the Japan Current. The lowest this winter, situated on the water front as I am, has been 30 degrees Fahrenheit. The coldest I have ever seen is 16°F. It very rarely gets above 90°F in the summers, and then for short periods only. Our rainfall is about 30 inches yearly.

Of course, my pride and joy are the three and four-star English hybrid rhododendrons. Loderi King George, Earl of Athlone, Fabia, Mars, Azor and Britannia are a few that I think of, without which I could not get along. The individual blooms of Loderi King George, measured 5½ inches across last year and they have a delightful scent of peaches that scents the whole garden. Most of my species come from a small nursery in Seattle. *Augustini* is very good and is a clear bright blue clear. *Williamsonianum*, *yunnanense*, *Griersonianum* and *ciliatum* certainly will hold their own with the hybrids. I have a number of other species which have not bloomed as yet and still hope to live long enough to see *auriculatum* open its white flowers in July.

Shade, plenty of mulch, and water seem to be the answers to rhododendron culture here. The soil is naturally acid but a little *old* cow manure seems to agree with mine.

J. E. HADDEN, M. D.,
Bremerton, Wash.

Rhododendrom reticulatum. (See page 173)

It has been some time since the Magazine published the close up of this charming species, with all the small

details that would be useful in remembering the flower and its characteristics. This time we are presenting a picture of a mass of seedlings in which the important thing to be presented is the habit, erect, a little thin, in the younger stages and with enough lightness to allow a play of sunlight through the mass. The photograph also suggests the manner in which the flowers sit lightly on their flowering twigs.

Albino forms have been reported and once were offered in a Japanese catalogue but no importations were made, worse luck, so now that is something to be desired and waited for. Meantime hundreds of seedlings have been raised and many saved in the hope that there might be some albinos among them. This has not happened, although there has been a wide color range from very light hues to deep tonalities of the same essentially lavender pink, which is so often excused as 'orchid'. If the texture of the petals were not so delicate that light, especially the cool crisp light of Spring, could not shine through them it would be a rather sorry color. As it is, light can shine through them and if the plants are set in such a fashion that they will get just this play of light, the effect is of really quite tender pinks.

The only other thing that has been interesting in the seedling masses is the fact that one lot of seed has produced plants that flower about one week to ten days later than their fellows and there is no difference in site that would excuse or explain it. The same sort of thing has been noted in seedling lots of the native Flame azalea, so perhaps it is a vagary of the genus.

Temperatures here go always to

zero, once in every winter and sometimes below; in summer to over 90 always, but the azalea goes merrily on its way and often opens the season, getting ahead of *R. mucronulatum*, unless we have a February 'spell' that fools the latter.

Washington, D. C.

Azalea, Sci-getsu. (See page 175)

Mention has been made in this department on more than one occasion of the very interesting azaleas that were introduced into the trade by the Chugai Nursery Company in Osaka Japan. They were given, it will be recalled, no other explanation than that they were 'indica-macrantha' hybrids. In some of the notes under the several varieties, definite statements were made such as "This is a hybrid between macranthum and Mad. Morreaux alba" and this interpreted in terms of present day taxonomy would mean a cross between *Rhododendron indicum* Sweet and some clone of *R. Simsii* G. Don., although the more one studies the old books in the golden period of the Indian Azaleas, the more dubious one feels about the pronouncements of the late E. H. Wilson as to the parentages of some of these fine plants.

There remains much to be learned about the Chugai hybrids before they can be announced as definitely useful for this or that purpose. The evidence here seems to be that they will eventually adapt themselves to outdoor planting provided they can be nursed along until there is an adequate amount of good firm wood. To how many named clones this statement will apply remains to be proven, since it is not improbable that the various 'indica' parents may themselves have transmitted varying degrees of hardiness. On the other hand one may take courage in remembering that there are many plants in

this area which go through a period of uncertainty before deciding to stay and thrive. Young plants of crape myrtle often die to the ground several winters only to become eventually quite hardy.

The variety flowered here is pot grown and spent its winters in a cold pit. Plants of the same clone have now gone through two winters with no conspicuous damage except in the very smallest cuttings, which had not 'wood' enough. The shape and carriage of the flowers recalls that of plants of either line, but the very rounded smooth quality reminds us of the character of the flowers of *Azalea macrantha*, now *Rhododendron indicum*. The color is described in the original as 'lilac with purple' which is vague enough, but the color is seen here as a clear lavender. Flowering like that of its fellows is late. In a season like that of 1945, which was premature, the members of this race flowered from the latter half of May in the earliest clones to the end of June.

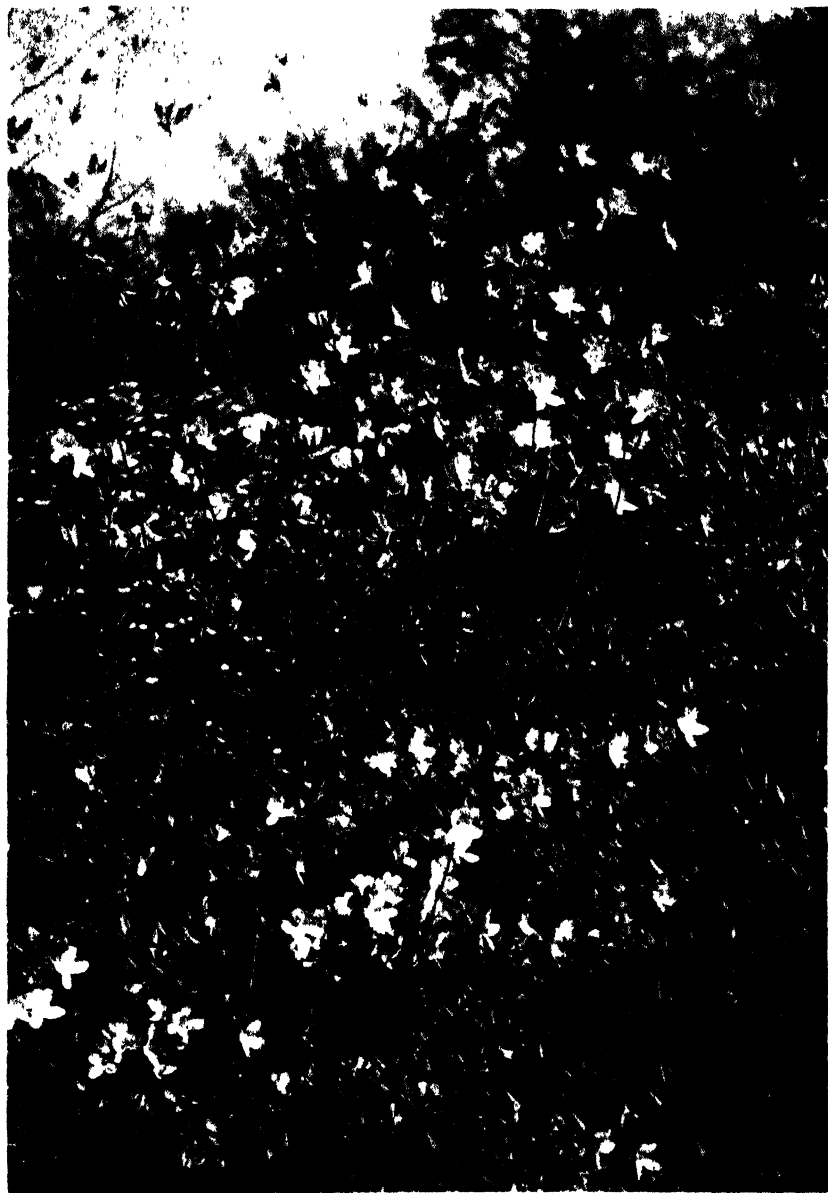
I am told that this is not considered a desirable feature in our South where these plants are on trial, but it seems strange that a continuation of the azalea season might be as welcome in Georgia as it is here.

With the coming season it is the intention of publishing more or less of a check list of these plants and show as many pictures as possible as there is already one catalogue in this country publishing a 'fancy' name for one of the plants that sounds suspiciously like the Japanese original.

Washington, D. C.

How tall is a Kurume?

There has been some exchange of correspondence with the Editor of this Section about the height of the Kurume azaleas. In replying to one inquiry, I



Claude Hope

Rhododendron reticulatum

[See page 171]

had occasion to quote Wilson, (Mono. Azaleas p.34, 1921) "The plants are seldom a meter tall, more usually less than half of this and quite commonly they are prostrate and hug boulders closely. The habit is normally dense and twiggy, when sheltered a few strong shoots develop and the plant becomes relatively tall and sparsely branched."

There seems to be some reason to add that the behavior of a plant that was observed and described from a high altitude, open area which was both sun and wind swept, might easily

be expected to change when the same plants were brought to lower levels and comfortable living. It should also be recalled that the plants as commonly grown in Japanese gardens at these lower levels are usually subjected to a twig by twig pruning that would dampen the ardour of anything!

It would be pleasant to reopen the subject of Kurumes and their possible height, but people writing us will please report whether or not their plants are grown under trees and if so what trees! Filtered light makes its own contribution to stature in under-plantings.

Narcissus Notes

B. Y. MORRISON, *Editor*

Notes from Alabama.

One reason daffodils are so universally loved is because they come so early in the spring. We have spent the winter months with just the green of conifers and evergreens against the gray of the leafless trees and we are hungry for color.

As a harbinger of spring they are as authentic as the bluebird or the kite tails on the telephone wires.

They are perfectly at home in the South, where they bloom and increase for years with very little attention. They should be divided every four or five years. If given bone meal as the foliage is dying down they form better buds for next year's blooming.

The daffodil belongs to the narcissus family. This family is divided into about eleven groups. Usually in the South the term "daffodil" is used in speaking of the long and medium trumpets. The small, fragrant yellows with rush-like foliage are "jonquils." The poeticus, the clustered varieties,

and the "twin Sisters" found in such profusion around old homesteads are narcissi. Of course the connoisseur is more meticulous in his classifications.

When we built a home eight years ago we found the soil a gray crawfish mud. In establishing our garden, which is rectangular and two feet above the surrounding grounds, we excavated the beds to a depth of two feet. We used stones and flattened tin cans in the bottom for drainage and filled in with a mixture of leafmold, sand, some clay and some of the excavated soil. Bone meal was then forked into the mixture. The daffodils were planted about four inches deep in groups among the perennials. Drainage is still our problem. After continuous rains the daffodils stand in water one to two inches deep. It soon drains off and does not seem to injure them, at least they live on and bloom and multiply. We hope to work the beds over and build them up several inches above the surrounding terrain.



Claude Hope

Azalea "Sci-getsu"

[See page 172]

All of the varieties are hardy in this latitude except the Tazettas and some of their hybrids. They have to be protected if brought into flower. They bloom in profusion in the open farther south. We have naturalized some this fall, under a group of trees and drifting beyond. We had to plant the trees and wait for them to grow before we could do this. It is the loveliest way to use them. When they bloom this spring, if they seem to belong, we shall add to the planting as the years go by.

Some varieties that we would like to add to our collection are Beersheba, Fortune, Sonja, Sunkist, Suda, Daisy Schaeffer, Mrs. Theo. Havemeyer.

Some of the varieties we have grown and enjoyed for years are listed below.

1. Trumpet Daffodils—Ben Hur, Diotima, King Alfred, Emperor, Olympia, Forerunner, Lovenest, Mrs. Krelage, Eve, Milo, Kantara, Imperator, Spring Glory, Glory of Sassenheim, Empress.

2. Incomparabilis—Bernardino, Red Cross, Sir Watkin, John Evelyn, Milford Haven, Dick Wellband, Francisca Drake, Pres. Viger, Stella Pratt, Galipoli, Red Shadow.

3. Barrii—Diana Kasner, Firetail, Fleur, Alcida, Sunstar, Sea Gull.

4. Leedsii—Gertie Millar, Tunis, Hera, Silver Star, Mystic, White Nile, Her Grace, Mrs. Percy Neal.

5. Triandrus Hybrids—Triandrus Albus, Thalia, Agnes Harvey.

6. Jonquil Hybrids—Campanelle single, Jonquilla Simplex, Jonquilla florepleno, Lady Hillingdon, Orange Queen.

7. Tazettas and Hybrids—Paper White, Glorious, La Fiancee, Laurens Koster, Orange Cup, Cheerfulness (double), Irmelin.

8. Poeticus—Recurvus, Albus plen-us odoratus, Rupert Brooke, Red Rim.

9. Double Varieties—Twink, The

Pearl, Argent, Orange Phoenix, Daphne.

10. Various Species—Bulbocodium Conspicuum, Cyclamineus.

It is always exciting to have something in your garden that you have not grown before. This year, among other flowers, we have added these narcissi: The Prince, Inglescomb, Mrs. R. O. Backhouse, Helianthus, Klondyke, Frans Hals, Actaea, Holland's Glory and Ettrick. They are not new introductions but they will be new in our garden. We shall await their blooming with eagerness. The waiting shall not be long for the little fragrant jonquils and some of the clustered narcissi are already in bud. By the last of January or the first of February the gay procession will begin and for several weeks the daffodil will reign supreme in Southern gardens.

MRS. J. T. HACKNEY,
Birmingham, Ala.

Notes from Kansas, 1945.

Kansas does have wonderful Spring weather for daffodils. We may have hot weather and dust storms later on, but we can boast of our beautiful Spring display.

Our daffodils stay with us and multiply. There may be a few losses in the early ones if they are not carefully planted and deep enough. King Alfred, for example should be planted twelve inches deep here. Poeta varieties seem to require a little mulch for they are the only ones I lose in my garden. If they do not do well I change their location. I had to try several years before I could grow the Leedsii, John Evelyn; finally I planted it in full sun and they are now in fine growth.

White Nile is a good multiplier and lovely; not large but pure white. If I could have only one white daffodil, it would be Ada Finch. It is very large

and beautiful. Comes too early for the Show. Some say it is too heavy and would not stand up but it did in my garden. Another choice one is Dick Wellband, very outstanding and always a winner if in bloom for the Show.

Last year I brought in a bud just showing color, placed it under the electric light all evening. To my surprise next morning it was fully opened and when taken to the Show won first place. I also tried one of the double Inglescomb 3. The buds were green on account of the long cold weather and I knew they would blast if left outside in that condition. The ones I brought in opened well and entered in the Show won a place. Those left out blasted.

When it stays cold for any length of time the thing to do is to cut them and bring them into the warmth. If blooms come too early, we cut them and put them in the ice box where they will keep for several weeks. Of course all food must be removed or it will take up the odors.

Some years the developing flowers are frozen stiff if we have a cold spell, but they seem to come through it if it is not repeated too many times. They are wonderful flowers and make one of my favorite garden hobbies, one that leads me on and on. This coming Spring I look forward to flowering of Daisy Schaffer, Staatendam, Eskimo, Damson, Havelock, Porthilly, St. Ives, Killigrew, Fairy Circle, Green Mantle, Hymettus, Lanarth, Red Rim, Daphne and many others planted last Autumn.

MRS. W. B. MILLS,
Topeka, Kansas.

My Daffodils, Clinton, New York.

One of the greatest joys of Spring-time are the bright cheery daffodils, which spring up with the melting snows. Among the first of these are the flowers of the fine yellow trumpet

Alasnam which I especially like. These are not only early but of good size and length of stem. Further down the path the golden King Arthur stands up tall and stately, although out of doors they do not give me as large flowers as the bulbs which are forced in the greenhouse.

My long row of Van Waveren's Giant come second early and always gives a wealth of bloom. They are a fine flower but the stems could be a little longer. Robert Sydenham and Olympia are also well worth growing although two of the older sorts. The handsome Dictima which blooms by the corner of the greenhouse is a special golden treasure. Matamax is also a good late flower but I have not forgotten Lord Wellington, which is worthy of the name and the best of all my yellow trumpets. The stems are long and the flowers keep wonderfully.

Over the hedge the fine line of Leedsii, Silver Star shows itself much at home and gives an abundance of pale yellow and white flowers, which fade to nearly white making a wonderful contrast with the deeper, colored kinds.

In the Incomparabilis Section, I am discarding Bernardino for the newer and better sorts. Among these are Walter Hampden, mid-season and a special favorite. I should like to have many of it. In the same group Will Scarlett, like an old friend brightens the corner with its gay orange cups. I think it could be discarded, however, for the newer much larger and better Fransisco Drake of similar color. Also of the same Section, I have a large clump of John Evelyn, which is a delight and joy, although I feel the flower do not last as long as some. Red Cross is another strong grower with bold primrose flowers and cups of the same hue blended with orange. They

are fine enough for any garden or bouquet and I think that if I were to have but one flower it would be this. Red Shadow has flowers with beautiful orange headings, but they turn their heads down too modestly, a fault I find in several of this Section. Twink is the only double narcissus that I grow and while it has interesting orange and yellow flowers, I find they do not keep very long after being cut.

For very late flowering I like Alcida. I think that for sheer sparkling yellow cups and waxy white perianth, I have nothing else to equal them. A bouquet of these long stemmed beauties is a lovely picture lasts a long time and rivals the flowers in the garden where they also are long in bloom.

Two years ago I bought a collection of daffodils including bulbs of Schumann, Sheherazade, Hades, Eskimo, Orange King, Mayflower, Pygmalion, Adler and Village Beauty. So far I have tested them, I think Adler is the only one really outstanding but perhaps I shall find them much better on further acquaintance.

With daffodils as with other flowers there is the delightful anticipation of always new and better varieties coming along each year. I hope to add to my collection the yellow trumpets Megaphone and Moongold, and the white of the same class called China Clay; Incomparabilis Bertha Aten, Copper Bowl, Red Bird, and Scarlet Leader; Peking and Pomona in the Barrii Division; Leedsii Daisy Schaffer and Poeticus Grand Opera to close the list

with possible some of the daint 'rock garden' sorts.

MISS GLADYS POWELL.

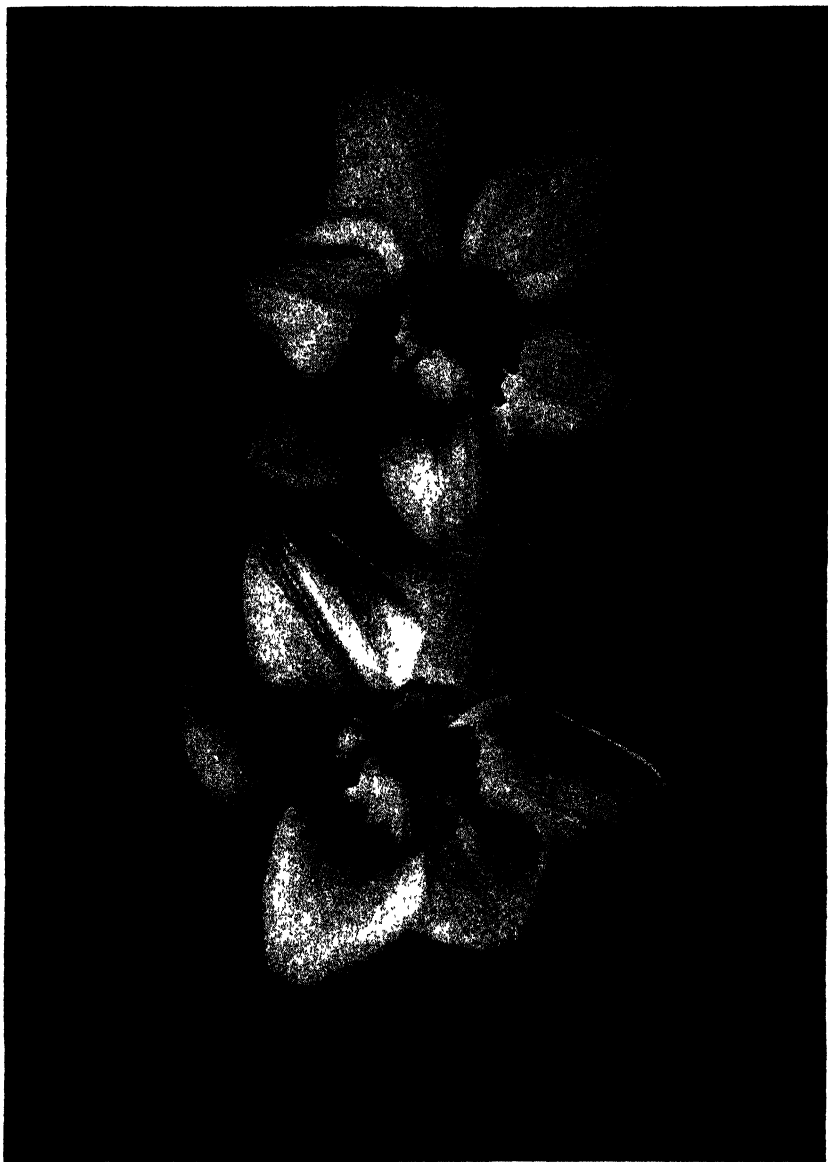
Narcissus, Quetta. (See page 179)

In the general pictures that gardeners are wont to paint in broad tones and colors, the narcissus is likely to contribute best in the pure yellow to white, since the finer colorings that come in cups no matter how brilliant the Incomparabilis or Barrii may be, serves in the mass, to warm the color that is set by the perianth.

All this is very well for the person who is interested only in such matters, but there are many lovely varieties of narcissus with charms that cannot be valued or appreciated from afar. Such is the case with the variety Quetta, which has the usual almost white perianth of its kind but a delicate citron cup, quite pale in fact, with a thin marginal rim of salmon orange.

For no special reason perhaps other than it did not enjoy the transplanting from its Irish home to my garden with the sterilization bath in between, this did not settle down well into growth until it had been here for some years. Now that all the bulbs are probably bulbs that have developed here it makes its annual offering in good faith. Visitors are not likely to notice it, as it does not demand the attention of its more lusty brothers, but people who have found a particular delight in such varieties as Fairy Circle, Carnlough in a good season, and some of the more delicate Leedsii poeticus varieties, will welcome it.

Washington, D. C.



Robert L. Taylor

Narcissus, Quetta

[See page 178]

Cactus and Succulents

W. TAYLOR MARSHALL, *Editor*

Cleistocacti, the Firecracker Cactus

To be interesting to gardeners, cacti must be of a type capable of successful cultivation in pots with ordinary care and they must also produce attractive flowers in cultivation. The *Cleistocacti* include several species that come into such a category because of their simplicity of cultivation and because they bear numerous, brightly colored flowers about the size and shape of a firecracker, followed by dark red fruits.

Flowers are produced early in the spring and continue throughout the summer months, each flower lasting a week or more. The first fruits appear in late July and others follow in succession through August into September.

Because of their base branching habit, *Cleistocacti* should be planted in fairly large pots, an 8-inch fern pot is suitable for either a seedling or a cutting. Soil should be the standard mixture of equal parts top-soil, sharp sand and well aged leaf-mold. Cuttings should be calloused by exposing the cut end to the sun for a week or ten days, covering the remainder of the cutting with several layers of newspaper. When well calloused plant about 2 inches deep supporting the cutting by a plant stake. Do not water for a week or ten days to allow roots to form and then only lightly until roots are well established.

Cleistocacti will not stand temperatures below 40 degrees and therefore should be taken indoors in early fall and kept in a light, dry place, preferably at temperatures above 50 degrees. Water very lightly about once each two weeks. In spring bring the pots outdoors into a partly shaded spot until

they become acclimated then put in full sunshine. A heavy watering weekly in hot weather is preferable to more frequent and lighter waterings.

Cleistocactus Baumannii, a native of western Argentina, Uruguay and Paraguay is the species preferred by most growers. It forms clusters of divergent branches up to 3 feet high and 1 to 1½ inches in diameter, ribbed and bearing spine clusters at frequent intervals. The spines are yellowish to brown with a few longer ones of dark brown. The flower first appears as a small bunch of grayish wool and this lengthens into a three-inch, pencil shaped, orange-scarlet flower that hardly opens although crimson style extends beyond the petals at maturity. The fruit is a round, dark red-brown berry about ¾ inch in diameter.

Cleistocactus Grossei has shorter, slimmer stems and its spines are longer and a beautiful golden color contrasting in a striking manner with the curved, bright salmon-pink flowers. This species is just becoming available but should prove very popular.

Cleistocactus Smaragdiflorus greatly resembles *C. Baumannii* in size and appearance except that the spines are usually shorter and darker and the scarlet flowers are tipped with emerald green.

Cleistocactus Straussii, known as the "silver torch cactus" has several erect branches which are hidden by soft, bristle-like silvery spines. This species seldom flowers in cultivation and it has a distressing habit of drying back from the tip in the second or third year, always sending up new branches to replace the drying ones.



Cleistocactus Grossei Bckbg. $\times 0.5$

Golden spines and salmon pink flowers contrast with green stems

Cleistocactus arcolatus and the closely related, if not conspecific, *C. Roezlii*, *C. tominensis*, *C. Herzogianus* and *C. parviflorus* are all large growing species that rarely flower in cultivation and are unsuitable for pot culture.

Cleistocactus tupizensis is a less attractive companion of *C. Straussii* with long, golden and brown spines. It shares all of the objectionable features of *C. Straussii*.

Cleistocactus Morawetzianus, from central Peru, is a newly introduced species which is said to have white flowers.

The genus *Cleistocactus* should prove particularly attractive to a genuine cactophile as most of the 13 species and 6 varieties are obtainable. The two species not previously mentioned, *C. Buchtienii* and *C. hyalacanthus*, are collectors items.

W. TAYLOR MARSHALL.

Easter Cactus

The name Easter Cactus is as fully accepted as is the name Christmas Cactus but in the latter the name is applicable to but one species and its varieties while the name Easter Cactus is applied equally to two species in the genus *Schlumbergera* both of which produce their flowers in April and May.

Schlumbergeras are similar in growth habit to *Zygocactus* and are also native to the tropical rain forests of Brazil, where they are epiphytic on trees or grow amid rocks in shaded locations, living on humus and watered by the rains, which are of almost daily occurrence.

In cultivation they should be potted in a soil mixture of equal parts of top soil, sharp sand and well aged leaf-mold with the addition of one teacup of well rotted cow manure to each gallon.



Schlumbergera Gaertneri

After flowering a rest period of a month at least is desirable during which water should be very sparingly applied and the plant allowed to shrivel even to the extent of dropping some terminal branches, when the plant of its own accord shows signs of renewed activity, water applications should be increased and a daily syringing given on warm days. Liquid fertilizer or complete plant food should be applied several times during the summer.

As soon as the weather becomes chilly in early fall plants should be removed indoors where water can be given twice weekly and the entire plant syringed occasionally. In late January reduce water allotment and discontinue syringing to induce a partial rest while the buds form but when the buds are set more frequent waterings can be resumed but without allowing water on the plant.

Propagate from mature branches which should then be allowed to form a callos over the cuts by exposing the cuts to the sun, covering the rest of the cutting for about three days then set the cutting with the lower $\frac{1}{2}$ inch in the soil in the pots and soil in which they are to be grown. Support the cutting by a plant stake and do not water for about three weeks to allow roots to form.

Both *Schlumbergeras* and *Zygocacti* are grafted on foot long cuttings of *Pereskia*, *Selenicereus*, *Hylocereus* or flat stemmed *Opuntias* by

either the cleft or the flat graft method. Grafting assures quicker maturity and flowering and raises the flowers above the side of the pot and brings them into easier view.

For grafting the stock should be at least a foot high and well rooted in a pot. The cleft is made by splitting the top of the stock to a depth of an inch with a very sharp knife then cutting the scion into a wedge shape to remove the epidermis from the section that is to be in contact, insert this wedge into the split in the stock and secure with a cactus spine then bind the graft with raffia or soft twine to prevent spreading.

To make a flat graft remove the upper two inches of the stock by a cut tapering upward and remove the epidermis of the scion in a similar manner from one side uniting the two by the insertion of two cactus spines and bind

lightly but firmly with raffia or elastic bands.

The grafted scion can be trained over wires shaped like a lamp shade to produce a very effective umbrella shape which shows the flowers to best advantage.

Schlumbergera Gacrtneri, the species most frequently cultivated, has terminal joints of an oval-elongate shape, flattened to resemble a leaf, 2 to nearly 3 inches long, dull green to copper colored, the margins crenate. The joints are truncate at the top where clusters of short, yellow bristles are borne.

In age the joints thicken into elliptic, bark covered stems. Flowers are regular, star-like, about 2 inches broad, scarlet red, with numerous petals somewhat recurved; numerous red stamens surround a longer, white style with 5 or 6 radiating stigma lobes.

Schlumbergera Russelliana has much shorter, oval joints which have fewer crenations and the 2 inch flowers are violet pink. This species is rare in cultivation but is a very attractive plant.

W. TAYLOR MARSHALL.

The Cacti of a Desert Section

That portion of Mexico comprised in the states of Coahuila and Nuevo Leon is particularly interesting to a xerophist because of the number and diversity of succulent plants found there. Each district has a flora exclusive to itself as well as other flora with a wider range.

Near the state line on the Saltillo-Monterrey road is a region of mountain ranges about 2000 feet high rising from valleys which, themselves are about 4500 feet above sea level. While the mountains are not lofty the walls rise steeply and are very rocky, the soil gravelly and calcareous and impervious to water, rainfall is sparse and spotty consisting largely of highly lo-

calized but heavy showers resulting in rapid runoff. Shrubby vegetation is sparsely scattered over the slopes but is densest in the runoff areas. The terrain is well illustrated by the photograph of the canyon here described.

Species of Cacti are restricted by altitudes and are encountered in bands as one ascends the mountain sides, the range of each species somewhat overlaps that of the species next above and below it. Common to the entire area is *Agave lechuguilla* Torrey and a species of *Hechtia* possibly *H. texensis*, both very spiney species that form large, almost impenetrable colonies in the midst of which the finest specimens of Cacti are usually found.

Commencing at the valley level we find numerous species of *Opuntias*, *Echinocactus horizonthalonius* Lemaire, *Coryphantha texensis* (Neolloydia B. & R.) Marshall, *Echinocereus sarisophorus* B. & R., *Echinocereus stramineus* (Enelmann) Rumpfer, *Thelocactus rinconensis* (Poselg.) B. & R., *T. bicolor* (Galeotti) B. & R. and a few specimens of *Coryphantha Poselgeriana* (Dietr.) B. & R. A specimen of *Thelocactus rinconensis* is shown in fig. 2 well protected by a colony of *Agave lechuguilla*.

As one ascends from the 4500 foot level to about 5000 feet *Mammillaria Leona* Poselger (Fig. 3) is found in association with several species of the pectinate spined *Echinocerei* especially *Echinocereus dasyacanthus* (Fig. 4) shown with its large, greenish-yellow flowers expanded. *Mammillaria Leona*, which is frequently confused with *Coryphantha Pottsii* Scheer which it somewhat resembles, is a very common plant in northern Mexico, presumably always at the 4500 to 5000 foot level.

From about 5000 to 5500 feet *Ferocactus Pringlei* (Coulter) B. & R.

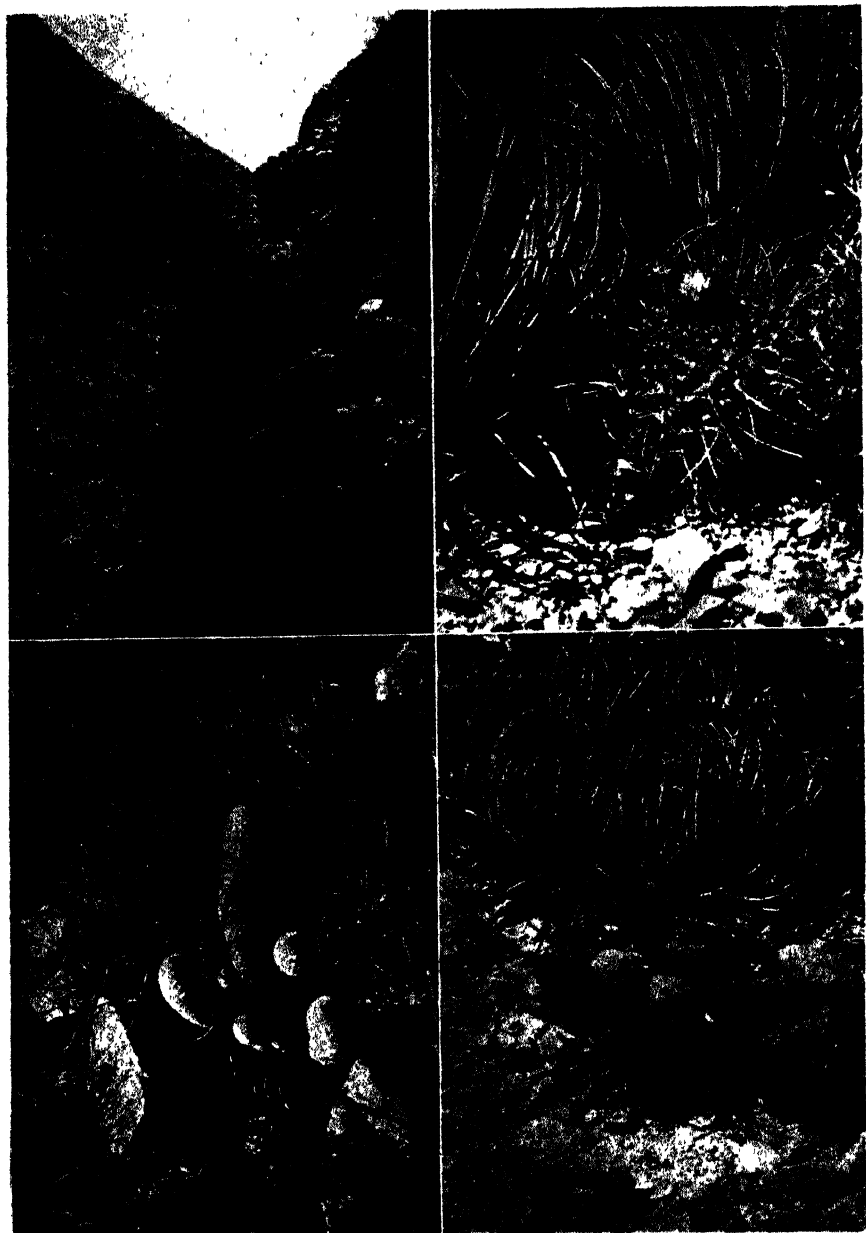


Figure 1—Typical collecting terrain between Monterrey and Saltillo, Coah., Mexico. Habitat of *Mammillaria Ritteriana*, *M. leonii*, *Ariocarpus furfuraceus*, *Echinomastus McDowellii*, *Thelocactus rinconensis* and many others. Figure 2—*Thelocactus rinconensis*. Figure 3 (lower left)—*Mammillaria leonii* in Coahuila. Figure 4 (lower right)—*Echinocereus dasyacanthus* in Coahuila.

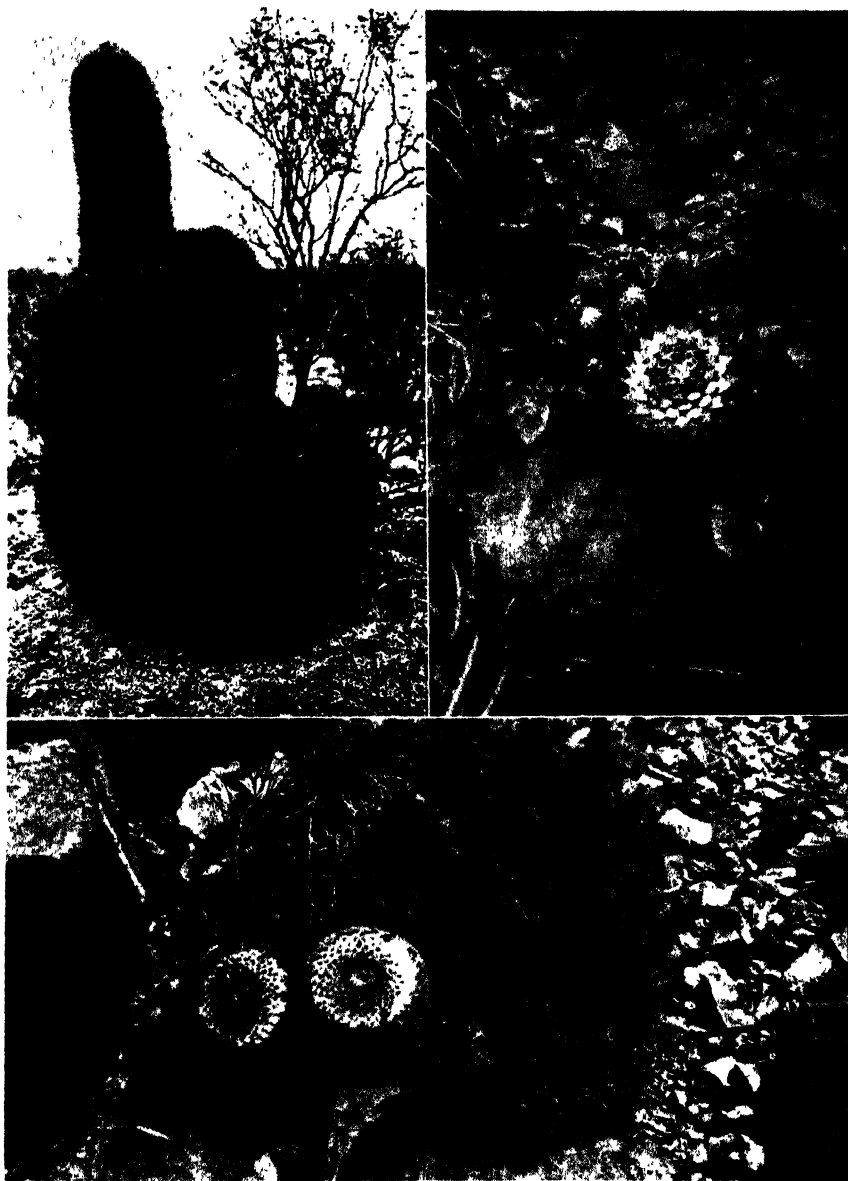


Figure 5—*Ferocactus Pringlei*, Coahuila. Figure 6—*Ariocarpus furfuraceus* and *Neolloydia conoidea*. Figure 7—*Mammillaria Ritteriana* and *Echinocereus stramineus*, Coah.

dominates, Fig. 5 shows it in a more level terrain but can give no idea of the brilliant red of its spines. Here also *Ariocarpus furfuraceus* (Watson)

Thompson and *Coryphantha conoidea* (D. C.) Marshall (*Neolloydia* B. & R.), are found. Both are shown in Fig. 6.

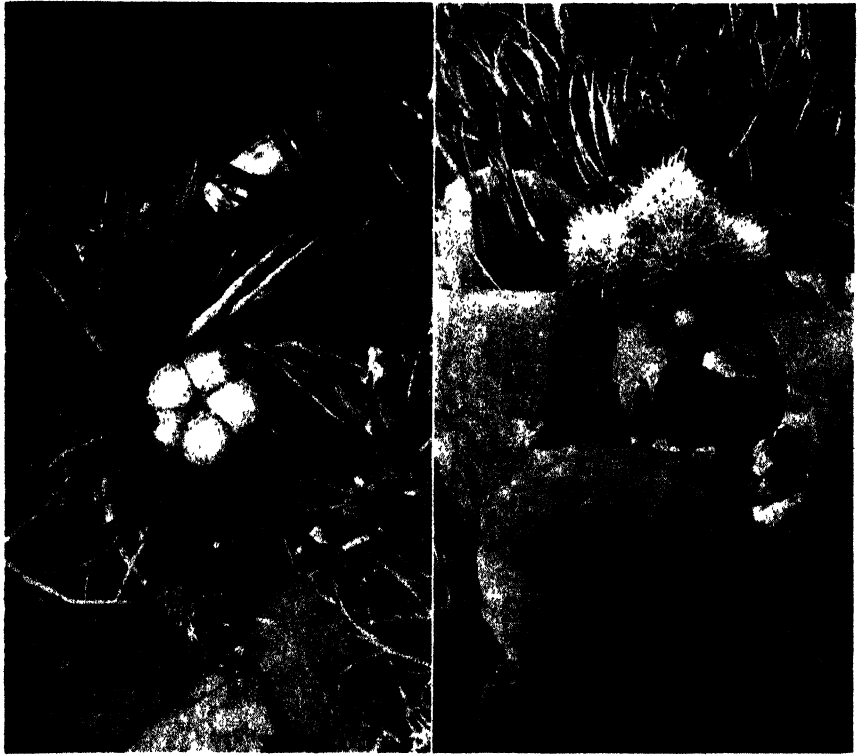


Figure 8—*Mammillaria candida*, in Coahuila. Figure 9—*Echinomastus Macdowellii*. There seems to be a variety that "clusters"; also great variety of spine colors, some nearly red.

Between about 5,500 feet and 6,000 feet we reach the range of *Mammillaria Ritteriana* Boedeker shown in Fig. 7 with *Echinocereus stramineus* (Eng.) Rümpl. both species are abundant in this vicinity. Occasionally the beautiful, white spined *Mammillaria candida* Scheid. are found snuggling amongst the rocks in such a manner as to suggest a nest of eggs as shown in Fig. 8. Here also *Epithelantha micromeris* (Eng.) Weber variety *pachyrrhiza* Marshall sinks deep carrot-like roots into the calcareous soil and an unknown species of *Echinocereus* with stoloniferous roots was located. This species is now under observation.

Finally, as one nears the summit of

the mountains vast numbers of the long, pure white to reddish spined *Echinomastus Macdowellii* (Rebut) B. & R. occupy niches in the rock of the almost perpendicular mountainside. Here also wonderful specimens of *Agave Ferdinandi Regis* Berger, described by Brown in the January issue of THE NATIONAL HORTICULTURAL MAGAZINE are indigenous.

Our short but steep climb, in addition to revealing many charming specimens, should teach us that all of the species here considered will require a loose, gravelly soil with a high lime content and that water should be supplied sparingly in warm weather and very sparingly in winter and that none

of the species can be expected to be hardy in American gardens but must have indoor or hot house care during our winters.

ROBERT E. FLORES.

Death Valley Flora

Between 1925 and 1932 business required me to spend several days each second month in the Death Valley region of California and Nevada but I have not visited the region since it became a national monument and a favorite winter resort for many tourists. Instead the remote sections of Baja California and the high Sierras of Sonora have held my interest.

A recent telephone call from Mr. T. S. Palmer who was acting chief of the Death Valley Expedition of 1891 renewed my interest in that country and caused me to again read the very interesting report of F. V. Coville the botanist of the expedition published as a Contribution from the U. S. National Herbarium, Vol. IV, in 1893.

The Christmas holiday afforded an opportunity to again revisit Death Valley which I did in company with Ed. Gueguen, assistant to the editor of the Cactus Journal. We left Los Angeles early and drove through to Death Valley the first day, spent the second day in the Valley and the adjoining Panamint Valley and on the third day visited the country south of Barstow and returned to Los Angeles the third night. We had covered 701 miles and spent 14 daylight hours botanizing. The expedition of 1891 required about six weeks for the same distance.

Despite the excellent roads that made our travels so fast and easy the desert within fifty feet of the roads is just about as it was when Palmer, Coville and their party covered the territory on horses in 1891. The large tourist hotels in the Valley appear very impressive when viewed from a few miles away.

Plant life is unchanged and we were able to check all of the perennials noted for the various stations by the early botanists, the season being mid-winter the annuals were mostly absent. Our first check was made on the alluvial fan at the south end of the Funeral Range where the road from Baker to Shoshone crosses the Range. Here the creosote bush, *Larrea tridentata* (D. C.) Cov. is the outstanding feature of the vegetation with a scattering of the desert holly, *Atriplex hymenelytra* (Torr.) Wats., a silvery leaved plant largely used in Christmas decorations in the west. *Opuntia echinocarpa* Eng. & Big. represents the cylindrical opuntias while the platyopuntias are represented by *Opuntia basilaris* Eng. & Big. whose large magenta flowers prove so attractive in the spring. Only one other cactus was observed, *Echinocactus polycephalus* Eng. & Big. which here forms fairly large clumps of globose or short cylindric heads.

Death Valley itself is but sparsely covered with vegetation although both the creosote bush and the desert holly are found on the mountain sides, the outstanding plant of the valley floor is the pickleweed or iodine bush, *Allenrolfca occidentalis* (S. Wats.) Kuntze which grows on hummocks of mixed sand and clay at the borders of the salt marshes. The hummocks are formed by the drifting of sand amongst the branches of *Allenrolfca* and the subsequent higher growth of the plant. Some of the larger hummocks are three feet high and nine to fifteen feet long, extending in a northerly and southerly direction, corresponding with the prevailing winds.

The road to Lone Pine crosses the Panamint Range and we stopped for a check on the west slope of the range as we descended into Panamint Valley and here found the creosote bush, *Larrea tridentata* the outstanding plant, a very interesting little bush, called

burro plant or sand burr, *Franseria dumosa* Gray was interspersed with the creosote bush as it is over much of the desert. Desert holly is also a prominent feature. The same three species of cacti noted in the Funeral Range were found in the Panamints but here we found the very interesting shrub, *Thamnosia montana* Torr. & Frem. called the "turpentine broom."

Thamnosia is a yellowish-green, low, bushy shrub barren of leaves except in the growing season. Its fruits are about the size of peas and bright yellowish green in color with skin like an orange to which it is related. The stems bear numerous blister-like glands which yield an oil which is very irritating to the skin. The stems, when crushed give off a rank odor which later becomes a pleasant coconut odor and are used by the Panamint Indians to poultice open wounds to induce rapid healing. A tea is made from the stems and drunk by the medicine men who become crazed by it but then are able to find things long lost according to Mr. E. C. Jaeger.

We at first thought the turpentine broom to be a species of *Ephedra*, several species of which are indigenous to this region. *Ephedra funerea* is the joint fir of the Funeral Range while *Ephedra californica* is common on the deserts of California and Baja California and is harvested commercially and sold as a health tea having a fine flavor. It is called squaw tea by the desert rats who use it when coffee is short. They attribute to it aphrodisiacal qualities without any justification but it is used in the relief of some kidney complaints.

The creosote bush is used by the desert Indians for several purposes and was steeped and the resultant tea given to me by an Indian when I suffered from a kidney complaint and I believe that the fear of a second dose of the noxious fluid helped to immediate re-

lief, real or simulated. It is also thought by the Indians to grow hair and was offered to me for this purpose many years ago by a well meaning Indian friend.

Before making this trip I had feared that Death Valley would be spoiled since its inclusion in the National Monuments but I find that under the National Park Service all of the natural features of the Valley are carefully preserved while the greatly improved roads and comfortable accommodations provided for all classes of travellers has only made the Valley and its grandeurs available to more people.

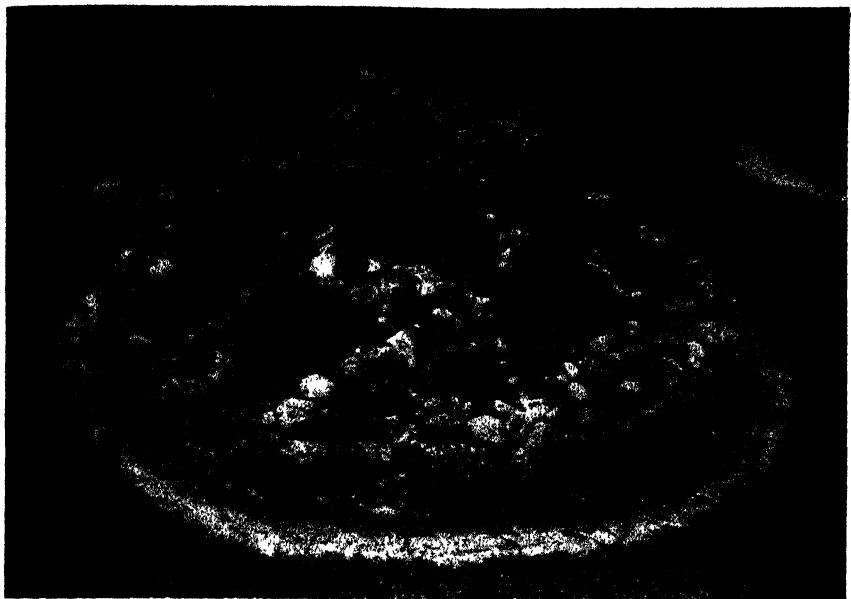
W. TAYLOR MARSHALL

Pediocactus Simpsonii an Alpine cactus

In the year 1859 an expedition under the direction of Captain J. H. Simpson, an army engineer officer, was undertaken to determine a direct wagon route from Camp Floyd to Genoa in Carson Valley across the Great Basin of the Territory of Utah. Accompanying the expedition as its geologist, Henry Engelmann, brother of Dr. George Engelmann of Saint Louis, sent to his brother many plant novelties including a very handsome cactus which Dr. Engelmann described in Transactions of the Academy of Science of St. Louis II:197 as *Echinocactus Simpsonii*.

At the same time Dr. Engelmann described a very small variety from Colorado which he called variety *minor*. In 1876 in Cactaceae of Simpson's Expedition the descriptions of both the species and the variety were amplified and special stress was made of the alpine location of the variety which came from "the gravelly moraines of the glacial period of Clear Creek Valley, between 8,000 and 9,000 feet altitude, and, in the southern part of the Territory, the Sangre de Cristo Pass, 10,000 feet high.

John M. Coulter in Contributions from U. S. National Herbarium III:



Pediocactus Simpsoni

7:377, 1896, described variety *robustior* based on collections in Nevada by Watson in 1868 and by Brandegee and Tweedy in Washington. As its name implies this is a much larger form with dark, nearly black spines.

This Washington plant was collected over one hundred years ago by Charles A. Geyer as reported by him in *The London Journal of Botany* 5:25, 1846. He took dried specimens and seeds to London and several seedlings were raised at Kew but no attempt was made to describe it at that time.

The plant is globe-shaped, covered with warts called tubercles from the apex of which the spines and flowers arise. These tubercles are arranged in spiralled rows and each one bears 20 to 30 spines which are white, brown or sometimes almost black. Frequently the plant branches from the base forming clumps of globose heads. The small flowers arise near the center of the plant and vary in color from pink to

whitish or yellowish. The fruit is a small green, dry berry.

Britton and Rose recognizing that this plant is not referable to any of the earlier genera placed it in a genus by itself in Britton and Brown's *Illustrated Flora* edition 2, 2:569, 1913. Their choice of a name for the genus is most unfortunate as *Pediocactus* means plains cactus and the species is a mountain dweller even though B. B. Smith reported it from Kansas.

The species should be successful for outdoor culture in many sections as it seems to take more moisture than most of the cactus species and in much of its range is under snow for most of the winter. We illustrate a bed of the robust variety as grown in Dieringer, Washington by A. S. Harmer of which he writes: "This bed of *Pediocactus* has been growing for two years and stood our rainy winters fine. 330 flowers were open at one time in May."

It will be noted that the bed is raised



Figure 1—*Epiphyllum strictum*

above the surrounding ground to permit rapid drainage of water as no cactus will stand water at its roots for any great period.

W. TAYLOR MARSHALL

Epiphyllums, Phyllocacti and Orchid Cacti

The epiphytic cacti are unarmed plants with large, often very colorful, flowers and are cherished by many who have no use for the more spiny species. Returning service men tell us that throughout Europe specimens of the epiphytes are found in most homes and in the United States their popularity is steadily increasing.

As we plan to have at least one article on this group of plants in each future issue it would be advisable for us to clearly define the group at the very beginning to avoid the taxonomic confusion that will otherwise arise.

These epiphytes are all contained in a sub-tribe of Cactaceae called "Epiphyllanae, and all of them are tree dwellers; with flattened, three ribbed

or, rarely, four ribbed stems that normally assume a pendent position. In cultivation it is usual to stake the stems to an upright position.

Early botanists thought that the flattened stems were in fact leaves and the first species introduced were named *Epiphyllum* by the botanist Adrian Haworth in his *Synopsis Plantarum Succulentorum* in 1812, a word compounded from the Greek *epi*, upon and *phyllum*, a leaf. The type species of Haworth's genus was *Cactus phyllanthus* Linnaeus. In 1831 the botanist Link erected the genus *Phyllocactus*, meaning leaf-cactus and he also selected *Cactus phyllanthus* Linnaeus as his type. The latter name, while invalid, became the commonly used name for these species and *Epiphyllum* was applied to one species only, *Epiphyllum truncatus* Haw. This confusion remained until 1890 when Carl Schumann proposed the same *Zygocactus* for the zygomorphic-flowered *Epiphyllum truncatus* Haw.

Schumann's proposal was largely disregarded until Britton and Rose in a bulletin of the United States National Museum issued in June, 1913, separated the sub-tribe into several genera based on flower structure, which separation was further increased in their monograph of the family issued in 1923. The system they proposed, with few changes, is now meeting general acceptance throughout the world.

Under this system plants in the sub-tribe fall into two general classifications:

First, species whose branches regularly divide by pairs.

Second, species whose branches arise irregularly from the primary stem.

The first section contains two genera with zygomorphic flowers, that is flowers capable of division into two symmetrical halves only by a single longitudinal plane passing through the axis

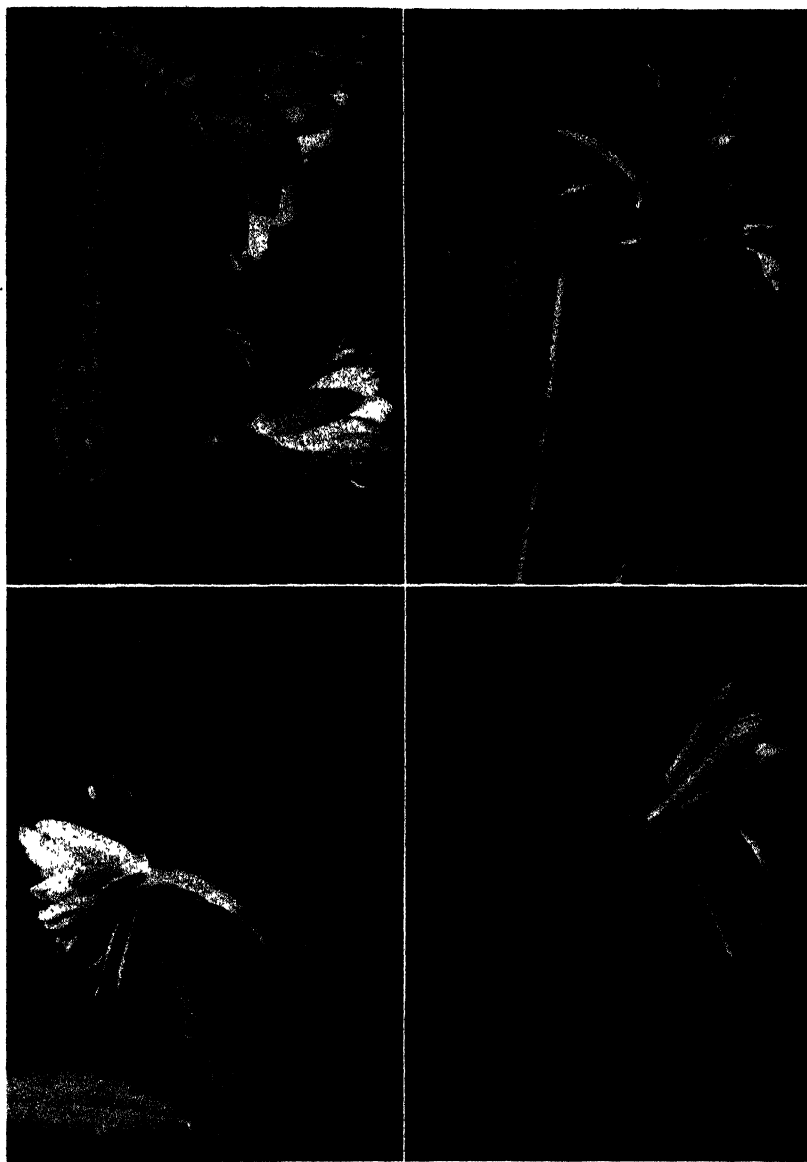


Figure 2—upper left; Figure 3—upper right; Figure 4—lower left; Figure 5—lower right. See last paragraph of text for explanation

Zygocactus, called Christmas Cactus, and *Epiphyllanthus*, a genus seldom seen here are similar in flowers but dis-

similar in body structure and one genus with regular flowers, *Schlumbergera*, called the Easter Cactus.



Figure 6—See last paragraph of text

The second section is again divided into species whose flowers have tubes which are definitely longer than the limbs, as illustrated in photograph 1, showing an opening bud on *Epiphyllum strictum*. Only the genus *Epiphyllum* has such flowers. If the flower tube is not longer than the limb the plant may belong to *Nopalxochia*, *Chiapasia*, *Disocactus* or *Eccremocactus*.

Epiphyllum Ackermannii Haworth has been included in the list of hybrids for many years, but when Charles L. Gilly found the plant in the wilds in the state of Veracruz, Mexico, as reported in *Cactus and Succulent Journal* in July, 1944, botanists excluded it from the genus *Epiphyllum* because its flower tubes were shorter than the limbs as well illustrated in photograph 2. Dr. Clover assigned it to the genus *Nopalxochia* where it unquestionably belongs.

The genus *Epiphyllum* as we will consider it contains only true species from the wilds with long white flowers which are usually night bloomers but in some species day bloomers, but invariably the tube of the flower is longer than the limb.

Intragenetic hybrids, which all have white or whitish flowers, could be spoken of as *Epiphyllum* hybrids, but the intergeneric hybrids with colored flowers can not be so considered and we prefer to speak of them as Orchid Cacti.

As one of the parents of these colorful intergeneric hybrids such remote genera as the terrestrial *Heliocereus* or the spiny, large flowered *Selenicereus* and *Hylocereus* have been used and some hybridizers have reported using the spiny, hedgehog-like *Echinopsis* for this purpose.

Undoubtedly *Heliocereus*, with day blooming red flowers is responsible for most of the color in the Orchid Cacti.

The flower of *Heliocereus speciosus* is shown in photograph 2 and similarity to it is displayed by several of the Orchid Cactus flowers shown in photographs 3 to 6.

The Orchid Cactus has a color range in its flowers from rich cream through apricot to the pinks and reds, often with a decided blue coloration in the flower throat. This blue or purple is clearly derived from the *Heliocereus* in the parentage.

It will be noted from the photographs that the true *Epiphyllums* have a very few, small scales on the flower tube while many of the Orchid Cacti

bear large, almost foliaceous scales indicating a strain of *Hylocereus*. The spines sometimes noted in the axils of the flower tube scales on Orchid Cacti indicate a strain of *Heliocereus* or *Selenicereus* in the parentage.

Photograph 2 shows *Heliocereus speciosus* above and *Nopalxochia Ackermannii* below. Number 3 shows Orchid Cactus Melody, number 4, Agatha, number 5, Padre and in number 6, Orchid Cactus *Phyllanthoides* × *Grandiflorus* is on the left and Dante on the right. All of the photographs were taken by Scott E. Haselton.

W. TAYLOR MARSHALL

A Book or Two

Plant Hunting in China. E. H. M. Cox. Collins, 14 St. James Place, London, 1945. 230 pages, illustrated. 12/6.

This is a most readable book whether one is concerned with the details of plant hunting, in China or anywhere else. Mr. Cox writes well and carries the reader along, with just that nice introduction of the discussion of the plants themselves that keeps the factual portions fragrant with flower memories for the general reader who will have seen most of the plants not in fact but in illustration only. There are fine photographs of the countryside, portraits of some of the explorers and habit pictures of some of the more important plants themselves.

The book is divided into periods, by time rather than anything else although the persons who worked within the period have much in common with their scene and yet that differing quality that made them "off and away." Some of them were pretty stodgy people; some of them were people one would like to know personally. Some of the country

sounds and looks in the pictures like a place to hunger after; some of it looks rather barren.

Perhaps the important thing about the book is that it brings together so much of what may slip out of history sooner or later if some such book had not been written. The thing that one ponders as he looks through the list of the plants that have been the outstanding contributions from the several collectors and the small percentage that have come to take a common place in the garden scene. But be this as it may it is pleasant to return to the earliest periods to the times before Fortune and his contemporaries and then to come slowly toward the remembered past.

Las Pinacces Mexicanas. Maximino Martinez. Vol. I, from the Instituto de Biología, Mexico, 1945. 345 pages with index, illustrated. In Spanish.

Through the generosity of our director, Mrs. Walter Douglas and the kindness of the author this volume came to the editor. It deals solely with the pines of Mexico leaving the treat-

ment of the other coniferae until Volume. II.

This is a very interesting book and one that will have to be taken into account by any botanist of the future whether he be working only with the genus *Pinus*, or whether he is concerned with the general flora. One of the serious handicaps that all scientific workers have found in recent years when we have been turning a more considered eye toward the flora of our hemisphere has been the lack of modern texts and modern treatments of the material at our very doorstep.

Dr. Martínez has been working for years in this field and his present work represents not only the study of whatever texts there may have been and they are several in this case, but also a very considerable amount of herbarium material as well as the study of the plants as they grow in the field. Mexico is relatively rich in pines and they are related in some groups with species that extend northward into our own country. As in all parts of the world where pines grow there are species of great value in the usual economic sense of that word and others like some of our own that have little. A total of 75 trees are considered, which number includes varieties as well as species. The plants fall in all the well remembered groups, so commonly used, in which they are grouped according to the number of needles in the fascicles. But this is not the only well considered basis of the keys and is not the only matter that is stressed in the study of the individuals. Possibly the paragraphs in which the author presents his opinions and arguments to sustain them as to the group relationships, are the most interesting parts.

It is not likely that many of the species and forms will be of horticultural

use in the USA, but as we travel more into our sister republic's domains, it will be a pleasure to look at the great forests with a more knowing eye.

Brazil, Orchid of the Tropics. Mulford and Racine Foster. The Jacques Cattell Press, Lancaster, Pa., 1945. 314 pages, illustrated. \$3.50.

This is a friendly and very personal account of the trip which the Fosters made to Brazil in search of the Bromeliads which have been their special interest and study for years. It has all the happy enthusiasm of something long dreamed of and then accomplished. The Fosters did not have an eye exclusively focussed on Bromeliads and those readers who are not concerned with these plants will find almost as much to interest them in the running account which deals not only with plants but with people and the life that one leads in that country.

If it did nothing else, it should point out the way to others that can be followed in travel with a horticultural and botanical purpose. There are still many parts of the world to be studied from our point of view and the amateur, who will study and learn his material in advance, can perhaps be the most valuable of all persons in the field.

One reads of this trip with a wish to emulate it, which should be an added pleasure to the Mulfords and to all who have profited by their labors.

Science and Scientists in the Netherlands Indies. Peter Honig and Franz Verdoorn. Board for the Netherlands Indies. Surinam and Curaçao. New York, 1945. 491 pages, illustrated.

This is a reference work, made up as it has been succinctly put on the dust jacket of: Original articles prepared

especially for the volume, reprints of similar accounts previously published elsewhere, a number of travel accounts, a number of shorter articles and a list of scientific institutions, societies, and workers in the Netherlands Indies at the time of the Japanese invasion. It is not a volume that one reads quickly or at times easily, but it is one to which the worker will return. To those of

us who have known only the great botanical garden in Buitenzorg, it will be particularly helpful in the extending of our knowledge and appreciation of the splendid work that has gone on in this part of the world of which we probably thought but little as we lived our routine lives, until the last war, touched us and quickened our interests and our sympathies.

The Gardener's Pocketbook

From the Midwest Horticultural Society

Adiantum Pedatum

The ferns as a group have not received the attention due them in the average garden. As a group they furnish a wide variety of forms and colors of foliage that will thrive in the veriest of shady situations. While some need swampy conditions for best results, others are forest plants and delight a good humus condition although the majority will grow in any good loam. Perhaps the most widely admired of the native ferns is the maidenhair (*Adiantum pedatum*).

The maidenhair fern is a forest dweller and is found in shady woods in well drained situations well supplied with leaf mold. The bright green leaves are generally semi-circular with the leaflets arranged along the spoke-like stalks. These stalks as well as all of the stems on the plant are a polished red-brown. New leaves are produced rather continuously all summer long. The leaves start as small round circles of a beautiful light red and unroll into the mature leaf. The plant grows from a short creeping wiry underground stem. This may be transplanted at any season of the year if the foliage is removed. Place a quantity of its natural soil or some good leaf mold around the stem and it will proceed to grace the

shadiest spot with a constant decoration of graceful and colorful foliage for many years. In dry spots watering would be beneficial.

This is one of the most beautiful of our native ferns and one that responds excellently in cultivation if given humus.

Calystegia

The popularity of Morning Glories is well deserved. However, there are many fences, arbors, and similar places where vines could be used effectively, but which do not merit the trouble of annual planting. Here perennial vines are at their best. Attention has been called to the perennial morning glory (*Ipomoea pandurata*) (October, 1944) which is quite tall growing and suitable for porches and arbors, and other tall spots.

California Rose which is listed as *Calystegia pubescens* (*Convolvulus japonica flore plena*) is a vine with dull green, arrow shaped leaves and a perennial root. Its general appearance is similar to many of the wild bindweeds. The flowers are a medium pink and quite double (the single is less commonly cultivated). While the plant produces the flowers singly, it is in bloom from mid-summer on and creates a pleasing effect. The foliage makes an excellent cover for a fence. Long stretches of boundary fence where a minimum of care can be given will be

enhanced by the use of calystegia. A good well drained soil and an exposure that is not heavily shaded are the main requisites for successful culture.

Spirea Billiardii

In glancing through the spring catalogues I have noticed the space given to an old plant of the spirea group. This species is being called "lilac" spirea by some and others have given their own appellations. *Spirea billiardii* is a good and bad shrub. Its good points are its recurrent summer bloom, and its pink flower spikes. The bad point is its open straggly habit. The stems shoot up from a creeping underground stem and grow from 4-5 feet high. They arch slightly but not sufficient to cover the open base of the plant. Because the stems tend to spread out a planting is needed to cover the open base.

As an in-between plant in a shrub planting it is very good for the summer bloom. The flowers are in spikes from 6-8 inches long and are produced during summer and fall. The color is a medium pink. Like most of the spireas this is not a fussy shrub in its cultural requirements. It certainly is a good addition to shrub plantings where summer effect is lacking. Probably the best use is interspersed among spring flowering spireas in bank and other mass plantings.

ELDRED GREEN

Prunus × *Eileen*

As an ornamental shrub *Prunus tomentosa* is quite a lovely thing with its white, pink tipped flowers in spring and its brilliant red fruits in autumn. Unfortunately it has the habit of opening only a few flowers at a time which detracts a great deal from its ornamental value in spring.

In endeavoring to raise a hardy free fruiting cherry suited to the climate of Manitoba, I crossed our native *Prunus*

Besseyi with *Prunus tomentosa*; these hybrids were of little value as fruit bearing shrubs, for though both parents are very prolific the hybrids set fruit very sparingly.

One of these hybrids however is amongst our choicest spring flowering shrubs. It grows to a height of about three feet with a spread of about five feet bearing immense quantities of white flowers tipped with pink. Many of these flowers are open at the same time and they last much longer in good condition than its more fertile cousins. We have named this hybrid P. × *Eileen* and our photograph shows one spray in bloom.

Prunus triloba simplex

The double flowered type of *Prunus triloba* is one of the choicest of spring flowering shrubs. Though apparently quite hardy in Manitoba it does not always flower freely and is sometimes a little difficult to transplant. Occasionally part of a bush will die out for no apparent reason, or sometimes a whole bush will die while its neighbour will come through our winters unscathed.

The single flowered form is a much more easily handled subject than the type and under our conditions, much better suited for landscape work. They are easily raised from seed and are easy to transplant neither do they suffer from die back in the way the double flowered variety does.

Like all the *Prunus* family, *Prunus triloba simplex* flowers with the greatest freedom and there is a great deal of variation in both colour and form, some having much wider petals than others. The colour varies from pure white to deep rose pink, some of these deep coloured and wide petaled forms are very beautiful and worthy of being cultivated vegetatively. The single flowered forms flower from a week to ten

*Prunus* × *Eileen**Prunus tomentosa*

days earlier than the double type and are therefore worthy of a place in gardens even where the type is thoroughly reliable.

F. L. SKINNER,
Dropmore, Manitoba.

Erythroniums

The wild or native bulbs are very beautiful. We have two kinds of *Erythroniums* or dog-tooth violets. *E. albidum* grows in our woods and is a very shy bloomer but the blooms look like tiny lilies. The old bulbs of these send out a long white runner under ground at the end of which the new bulbs form, so this variety never grows into close clumps. *E. mesachoreum* grows in full sun in the prairies, and I have seen meadows white with them.

These are larger, not recurved, white with the backs of the petals heavily shaded with lavender. They have spotted leaves. These *erythroniums* take kindly to cultivation and soon make large clumps which produce many flowers.

MRS. H. F. STEWART,
Saffordville, Kansas.

Rutger's tomato

On page 270 of THE NATIONAL HORTICULTURAL MAGAZINE for last October, is the following statement in regard to *Rutger's* tomato: "*Rutger's*, however, is not adapted to the heavy, rich prairie soils of the Corn Belt because it grows too rank and does not set heavy crops." May I say that we live on the western edge of the Corn

Belt; no soil can be richer or heavier than we have here; and Rutgers is one of the highest rated of the varieties recommended for this section. I have grown it for several years and consider it the best that I can get for the main crop. Last year I grew plants from certified seed, set them out in June and from 65 plants we had all we wanted for table use, canning, juice and I gave away a lot. People who saw them said they had never seen so many tomatoes on vines such as those we had. If it had not been for a flood on September 30, they would have continued to bear heavily till killed by frost.

MRS. H. F. STEWART,
Saffordville, Kansas.

Plants Wanted

Magnolia Campbelli and other dwarf magnolias.

MRS. GRACE HOUSER,
755 West 11th St.,
Pomona, Calif.

My Daisy Border

This border, created because of my fondness for daisies runs along one side of our large vegetable garden in which I "slave" a good many hours each summer. Before it lies a six-foot strip of very nice lawn, the very best on the place!

For tall plants in the back I have both annual and perennial sunflowers; the annual ones, small-flowered pink and yellow, and the perennial one, *Helianthus orgyalis* because of its lovely foliage. Butter daisies, Cosmos Orange and Yellow Flare, Tithonia, tall perennial asters including Violetta, Skylands Queen, Queen Mary, Mt. Everest, Harrington's Pink (that lovely pink aster), and Barr's Pink which isn't pink. There is also the wild purple New England aster and a seedling

chrysanthemum, single pink and tall.

For the middle border I have plants of different heights such as *Helenium* in four named varieties. *Doronicum*, as many single Korean Chrysanthemums as I can get to survive our winters, Black-eyed-Susans, *Heliopsis*, Shasta Daisies, Elder and wild daisies, Pyrethrums, *Rudbeckia* My Joy, several woods asters, in palest lavenders, pink cone flower *Echinacea*, Aster *Frikartii*, *Coreopsis*, *Anthemis* Kelwayi and all the lovely colors of the annual China asters.

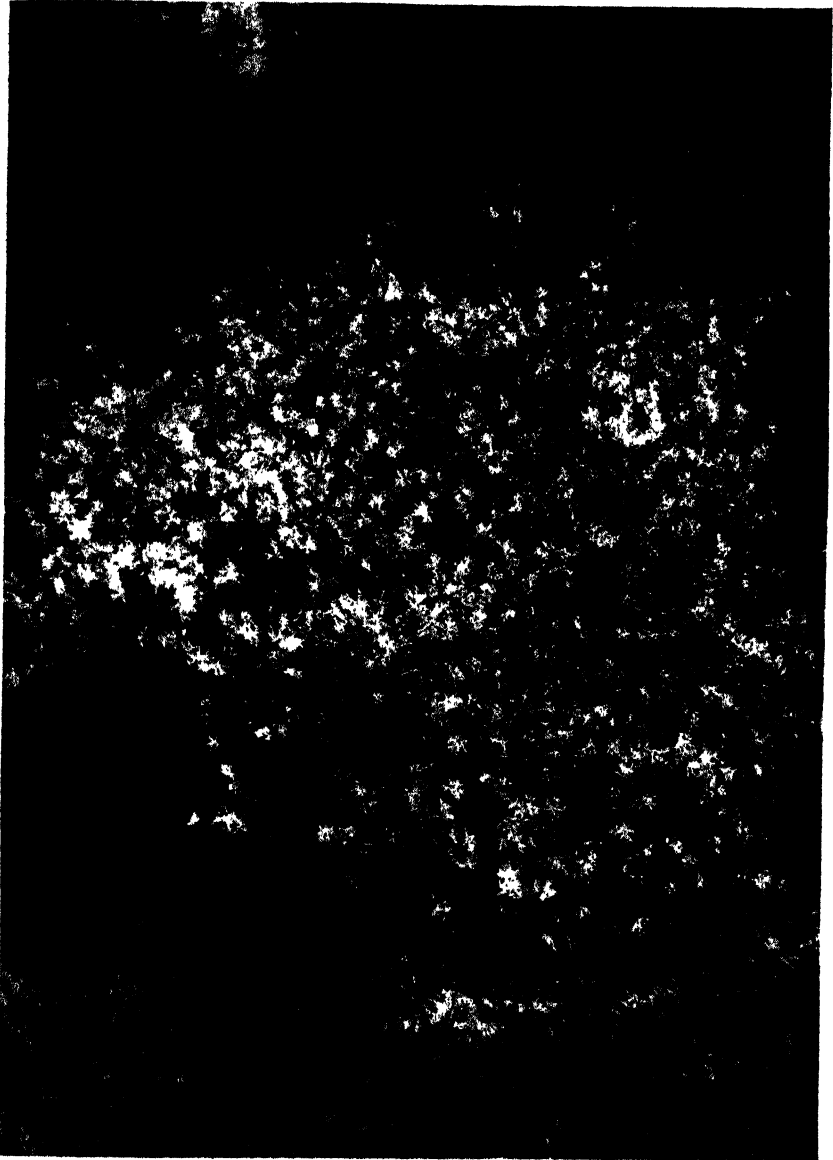
Next to the grass I have the low plants, dwarf baby asters, the Dahlberg daisy, and the African daisy *Dimorphotheca*. There are many more that I want but searching for new plants each year is lots of fun.

One might think a planting like this, monotonous, but the flower petals vary so much in width and the colors and shapes the centers are so distinct that I do not find it so.

MRS. CLYDE E. MARSH,
Hamilton, Ohio.

A Shrub or Two in Connecticut

Lasminum nudiflorum is hardy enough, but the flowering is not as early as I had hoped for, seldom coming much before forsythia. It should be backed, I think by brick or stone for really early flowering. *Lonicera fragrantissima* is all that its name implies and in normal winters is nearly evergreen. *Styrax japonica* is now a mass of sprouts, all that is left of a fine 25 foot specimen. The same is true of enormous bushes of *Hamamelis mollis* and *H. japonica arborea*. It was a sad day when I cut them down. I remember one January when *H. mollis* rose from the snow in full bloom as it will again, for the sprouts are very vigorous. My one entirely-dependable extra-early bloomer is *Cornus Mas*. The one here



Claude Hope

[See page 202]

Loropetalum chinense

was planted against the south side of the house for warmth, and now rises to the eaves. Its yellow cloud against the old white house is very pleasant on

a cold day in early Spring. *Fothergilla major* is a joy, one of the best shrubs of early Spring. Here it is a neat thing over 6 feet tall, covered to the ground

when in bloom with its curious and beautiful white tufts of flowers, and in the Fall, a flame. *Daphne mezereum* never disappoints me. From that day in early Spring when I lifted it from its box full of fragrant flowers, till now, years afterwards. *Viburnum Carlesii* was mine when it was first offered; it grew and bloomed for several years, then suddenly died. I haven't tried *V. Burkwoodii* yet. Our native *V. alnifolium*, planted in a dark corner, is a most satisfactory early bloomer, with its salvers of incandescent white. An *Exochorda* which came to me as *E. grandiflora* but is probably a *Giraldii* form and a very beautiful shrub needing more room than it has here so I cannot judge of its habit of growth.

Hamamelis virginiana should be more used. Its late bloom starts off the witch-hazel procession, which follows with *H. vernalis*, then *H. mollis* and then *H. japonica* these four precious shrubs which in a favorable season give me bloom from November until *Daphne mezereum* time.

ELLIOT S. FOOTE,
West Hartford, Conn.

Wild Blue Indigo

The wild blue indigo, *Baptisia verticillata*, is one of the beauties of the sand dunes found in the Kansas plains. It has wide, dark green, much divided, lupin-like leaves which form loose low mounds of green from which rises the stiff spires of deep blue pea-flowers. An old, well grown plant will have often as many as twelve or fifteen such showy bloom stems. Characteristically the blooms start opening at the bottom of the spike, the upper part of which keeps growing and developing new buds. The flowers stay in perfect condition for days, consequently the blooming period covers a satisfying length of time. The pods are fat green cap-

sules with the seeds fastened tightly along one side rib of the roomy chamber. I have often wondered at their house being so large. Most seed pods are filled to capacity, but not the indigo. One has almost to sit up with them along towards ripening time or some insect beats one to them. Often while the pod was still slightly green I have gathered them thinking that time I would be able to get good seed, only to find them eaten out and destroyed.

Fully ten years ago I was fortunate enough to get to the plants at exactly the right time and gathered about a half pint of good seed. That fall I made a considerable planting of them, also the following spring, but not a seed germinated. For a year, or two after I tried different ways of planting that seed but never a plant to show for it.

Five years ago last spring we moved to our farm here and of course the box of seed came along. Some way I never got them entirely looked over until the fall of '44. When I found the package of old indigo seed I started to throw it in the fire but never could bear to burn any seed. So took it out and scattered it on a vacant spot in the rock garden. I did not in any sense plant it, just threw it away, but from force of habit I stuck up a marker, and thought no more about it. Last spring I noticed some seedlings in that spot that reminded me of the old "lupin," and referred to the marker which showed it really was that plant. It took me a few minutes to recall throwing the old seed there. Without the marker I would never have been sure.

There are about twenty husky plants, several of which were transplanted when the first true leaves appeared. Late in the summer I lifted a few to send to an eastern grower and found even then, getting to the bottom of



Claude Hope

[See page 202]

Chionanthus retusus
Chinese Fringetree

their roots a task. Consequently they will probably stay where they are, which is anything but an ideal situation for them, as in their native home they grow in a strictly neutral, loose, sandy soil; in full sun and wind. Here they will be shaded all afternoon and the soil is heavy and quite acid. I think I will try moving a few of them in the spring to more congenial surroundings, hoping they will reward me with at least a few of their fine indigo spires. But the why of their coming up so sturdily now after their former sulky performance is a puzzle to me.

MRS. H. P. MAGERS,
Mountain Home, Arkansas.

Loropetalum chinense (See page 199)

This is a shrub that has been out of horticultural notice for many a year and for no good reason perhaps, since it will root from cuttings. To be sure no propagator will mistake his task for such as rooting of privet or deutzia, but he can do it if he will, and now that the scientists are all taking a look at such matters he can invoke their artifices.

If one looks in Dr. Bailey's inevitable cyclopedia, which wasn't printed yesterday, he will find a fair list of bibliographic references all of which antedate the cyclopedia. What is the catch, just the accident of sales and demand?

The shrub belongs in the Witch-hazel family as one can easily guess if he looks at the photograph, although the bush habit is much more twiggy and compact. During the growing season and through the summer well into the trying days of winter, the bush is well dressed with smallish, rather dull leaves that look as if they were going to be evergreen. Doubtless they are in the South or in frost free climates, but here, where it is on the upper limit of its supposed hardiness, the leaves

suffer, and look shabby as winter advances, falling sometimes in the Spring in whole or in part.

When the weather is favorable, the flowering, here, begins in the autumn, but usually there is no catch bloom, and one must wait till Spring, when the whole plant is dressed in the fleecy appearing masses. The texture of the flower mass is so distinct that it competes well with the other spring-blooming shrubs that are also white, be it pure or tinted.

Washington, D. C.

Chionanthus retusa (See page 201)

Like *Loropetalum*, this too has had a strange history. It is not easy to propagate and so its absence is perhaps understandable. Like other plants with pithy stems it does not yield easily to the tricks of the propagator who wants to raise cuttings and the same characteristic, in grafting, is bothersome, even when seedlings of the native Fringetree are available.

It is high time, however, that some one really made a job of it and produced it by the hundreds. In no way does it compete with the native species. In that, the habit is open, and the drooping panicles of lacy flowers are quite large enough and lax enough to give a special quality to the whole, as if some thin white cloud had filled the tree with a whiteness as subtle as the fragrance. In this plant, the panicles are much shorter, the petals stubbier, and the whole mass more compact so that the white masses thicken over the growing foliage. The photograph shows the detail of the inflorescences well enough and suggests the character of the individual flower.

The plant itself is usually described as a shrub to small tree but there is rarely a suggestion as to in what part of the country, the plant makes the



Robert L. Taylor

Coreopsis tinctoria

[See page 204]

small tree. Here, the oldest plants have reached about 15 feet in a little over 20 years. They grow with several stems and although they are crowded in with

other small trees and such there is every reason to believe that its upright habit is unnatural, with the ascending trunks forming a broad flat head over

which the waves of white flowers surge in June. Fruiting, as seems to be the case in the native species, is unpredictable and the fruits themselves ripen irregularly in the panicle, so that one who wants to gather them, must visit the tree again and again if they are not eaten first by the wild things that are always hungry.

Washington, D. C.

Calliopsis (See page 203)

Although this old and familiar annual must now be called *Coreopsis tinctoria* for many of us who have known it as a familiar and permanent garden resident, it will remain *Calliopsis*. It is a good American and seems to be the only one of several species from our Great Plains with their greatest concentration in Texas. Its European debut must have been about 1824, for it appears in Curtis Botanical Magazine as Plate 2512 (1824) and in Edward's Botanical Register as Plate 846 (18..) and these journals were then, as Curtis Botanical Magazine still is, indices of current novelties in the horticultural world.

Seed catalogues from the continent, have in their time shown a diversity of races the diversity coming chiefly in stature and in the degree of dark crimson brown that marked the ray florets.

For best success, it should be sown early in the garden where it is to flower. Certainly from Washington southwards or in any other place where the winters are not too cold, it should be sown in the autumn so that a fine flat rosette and a good tap root can form before cold weather. Once established it will self-sow freely and the problem will be which seedlings to leave and which to pull. This is important since it blooms here at Polyantha rose time—as well as later—and can set their

pink to crimson flowers out of tune with everything else.

From the strong rosette the plants send up well branched stems that spread nicely each branch bearing its load of bloom.

The illustration shows the flowers grown from mixed seeds with a fair proportion of semi-double blooms, the doubling coming from extra ray florets and from petaloid development of the disk florets. Possibly the time may come, as it already has come for the marigold, when the ray florets are suppressed and the disk florets go quite wild, making what the illiterate quite glibly call 'mums'. Although my own personal prejudices have been quite overcome, as far as marigolds are concerned, I still welcome the occasional marigold that brazenly reverts to a single row of ray florets typical of its presumptive ancestor, and a great cone of disk flowers.

Unlike marigolds which are strong and vigorous plants, the calliopsis is an airy piece and one can imagine a certain loss of lightness if all the flowers were solid heads of shaggy curling petals.

The yellows are clear and rich; the brown reds warm and intense. The spottings and fleckings vary in degree and kind as can be seen from the photograph, except that no flower is there to represent the old variety *The Turk* in which the ground was warm maroon and the yellow showed only as scattered spots of various sizes.

The flowers last well when cut and the plants give off a faint resinous odor as do many composites.

Nicotiana (See page 205)

As far as gardens go, not many species of *Nicotiana* enter into that sort of cultivation and this is no place for the discussion of the others that



Robert L. Taylor

Flowering tobacco: Nicotiana glauca

[See page 204]

make up that numerous family. As far as this reporter is concerned, he will supinely follow Mr. Ricker's treatment in Bailey's Cyclopaedia and take for granted that his plants would come under what Dr. Bailey records as *N. alata* var. *grandiflora* and the horticultural race known as *N. Sanderae*. It is quite possible that among them all there is not a single individual that would precisely fit the descriptions of either of the cited races.

It should be understood from the beginning that the chief if not the sole purpose of growing the flowering tobaccos, is to fill the garden with perfume after sundown. The plant has little beauty to commend it, with a more or less ungainly habit, a tendency to 'lean on its elbow' as it were and often enough thin flowering shoots. All this may be due to the acid soils in the writer's garden since Mr. Ricker plainly states that the soil should be rich in lime and potash.

The seed like that of many of solanaceous plants, is very small so that one overplants no matter how carefully he distributes it. The seedlings grow well in warm weather and transplant more successfully than their insignificant early root system would suggest.

The writer still recalls the first time he moved seedling nicotianas and his amazement that all did not wither

away. Even the partial clipping of the leaves did not appear necessary. Once transplanted no further attention seems necessary.

The flowering sprays last well when cut and a fair proportion of the buds continue to open. Inside, in a not too strong light, the flowers stay open all day but to this nose at least, the perfume comes only in the evening and early night. It is a pervasive, but not oppressive scent and suggest in a vague way the scent of its cousin the petunia.

The flowers in the picture illustrate well enough their physical appearance, the uppermost from a flower that must have known something of *N. Sanderae*, at some stage; the lower two come closer to *N. alata*.

If the gardener lives far North and has to hurry between frosts he will sow his seed inside, pot off the seedlings and set them out when the weather is warm. If he lives hereabouts, he can sow the seed outside in April and get good flowering. The first frosts of autumn do not kill the plant, only the half-opened flowers and many more will come should there be an Indian Summer. The plants themselves usually have to be pulled out quite green. Further south, the plant is reported as a perennial and from all parts there are uniform stories of its natural self sowing.

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Robert Taylor

[See page 249]

Peach Blow

Hedges for North America

DONALD WYMAN, *Arnold Arboretum*

Everyone interested in gardening considers the planting of a hedge at one time or another. There are times when only a privet or barberry hedge is contemplated, possibly because these varieties make up the hedges used on neighboring properties. On the other hand, when one of the better materials like hemlock is used in a hedge and planted in a situation where it thrives consistently, then there is interest and beauty derived from that hedge for years. In fact, there is no better nor more beautiful hedge available than one made of well-grown hemlock. It is satisfactory as a hedge and beautiful as an ornament three hundred and sixty-five days each year. Fortunate is the person who knows this and uses it. Many ornamental shrub and tree varieties can be grown in hedge form. In order to make hedges more beautiful by using interesting and diverse plant materials, let us consider some of the important factors to be contemplated at the time the hedge is being planned, and then let us consider the many, many plants which can be utilized for making good hedges in this country.

A hedge is a line of plants grown in an unnatural clipped form, hence there should be some good reason for growing them in this way. A line of well-grown shrubs or trees allowed to grow in their natural form unquestionably results in a much more beautiful line of plant material. One of the foremost reasons for using plants in a clipped hedge is to form a barrier in order to keep people and animals within (or without) the property limits particularly on the small property where space is at a premium. Some-

times a background is needed for a perennial border or as a formal line of demarcation between one part of the property and another; or sometimes a long flowering hedge is desired to mark the limits of a property. Regardless of the purpose for which the hedge is planned, it should be very clearly defined before the hedge material is selected, for there are plants which can be chosen to best serve each special purpose.

There is a second reason for giving the purpose careful consideration at the start. If a three-foot barrier hedge is to be used, then the mature width of the hedge should be planned to be at least three feet. If a fifteen foot screen planting is desired, in order to have a hedge that is well grown, a space on the ground nearly fifteen feet wide should be allowed for the hedge to grow sufficiently wide for that height. Even a hemlock hedge might be allowed only three feet in width if it is to be kept three feet high, whereas the same hedge might need nearly fifteen feet of ground space if allowed to grow fifteen feet in height. This matter of allowing sufficient width for the hedge is a very important matter. It is of the utmost importance to understand it thoroughly before the hedge is planted in order to allow sufficient space for future growth. Many of us have seen old Norway spruce hedges allowed to grow ten to fifteen feet tall, and only allowed a three or four foot space to increase in width. The result is a narrow hedge that soon gets open and devoid of branches at the base and there is nothing that can be done to coax more branches from the base. One

must, therefore, select a hedge which at maturity can be kept well within the limits set for it.

A windbreak or screen frequently is given considerably more room than a formally clipped hedge, for the windbreak or screen is frequently allowed to grow unclipped.

When the purpose for the hedge is known, then its height and width can be determined, and not until then. It is only after these items have been definitely decided that the plant material can be selected and the hedge can be placed. As an example, take a paved walk through the garden along which the hedge is to be planted. Should the hedge be three or six feet from the edge of the walk? If a three foot yew hedge is desired, then the ditch might be dug two feet from the walk. Know the purpose the hedge is to serve, its desired height when fully grown, then determine its exact location. One other very important point is never to plant a hedge exactly on a property line. If this is done, some disagreeable neighbor might, at some future time, chop down that half of the hedge on his property. He would have a legal right to do so. If, however, the hedge was so planted that at maturity all plants were within the property line, then the owner would have full jurisdiction over it at all times.

Planting

In planting hedges it is best to dig a ditch. In general, the ditch should be about 18 inches wide and from 12 to 18 inches deep for small hedges, but for larger hedges and evergreens these dimensions might well be doubled. If the soil is poor, make the ditch larger, fill it with good soil, fork in some well-rotted manure or other humus, spread the roots, cover them carefully with soil and firm the soil until the surface is almost up to the surrounding grade. If the plants are set

a trifle low, water will flow towards the hedge. A surface mulch around the plants prevents the soil from drying and baking. As in any other transplanting operation, the tops should be cut back considerably to compensate for the roots lost in digging. The young hedge plants should be cut back to within a foot of the ground at least if they are deciduous, preferably more if possible, because the lower the plant stock at this time, the sooner it will become bushy and well branched at the base. After planting is completed, the entire hedgerow should be well watered.

Hedges should be planted in well-drained soil and so situated to receive a maximum amount of sunlight. This is most important, for, though certain types of hedges will withstand shade better than others, shade is one of the chief reasons why some hedges are scraggly and uneven.

Spacing

Individual plants may be spaced from 18 to 36 inches apart, depending on the kind and size of the plants, and the quickness of effect desired. There is no necessity for planting closer than 18 inches except possibly with some of the dwarf types.

Since privet and barberry are cheap, most people can well afford to place them close together, at 18 inches. On the other hand, evergreens cost considerably more; but, in order to meet the increased expense of this type of hedge, the home owner can space the plants farther apart, at 36 inches, and wait several years for a permanently close and compact hedge. If he is in a hurry for the permanent effect, he buys larger plants and spaces them 18 inches apart. The important point to remember is that in a few years the ultimate effect of both hedges will be the same. The only difference will be that the closer planted hedge will look its part a few years sooner.



Dwarf box as grown in one of the many gardens at Mount Vernon, with Buxus sempervirens bordering the garden

A flowering hedge, Syringa persica, which can be clipped only once a year, and that immediately after flowering

Another method of obtaining quick results in a hedge is to plant two rows, 18 to 24 inches apart, the plants in one row being opposite the spaces in the other. This, of course, makes a wider hedge and insures the filling in of the bare spot made by a dead plant.

One of the purposes in planting a hedge is to keep dogs off the property. This object is easily accomplished by a mature, closely planted, thorny hedge, but the same thing can be done with a young hedge which is not thorny and where the plants are spaced far apart. A strip of chicken wire, from 2 to 3 feet high, is staked up through the center of the young hedgerow, and by the time the wire begins to disintegrate, the plants will have grown sufficiently to present a barrier themselves. If a hedge must be grown in a shady place and the resulting growth is always more or less open at the bottom, it is a good plan to keep a strip of chicken wire in position in this way. It is not seen, and it keeps the animals out.

Some hedges of white pine, hemlock, beech, spruce, and other tree types, fifty years old and only about 5 feet tall, which were originally planted 18 inches apart, are still in perfect condition, fully demonstrating that tree types can be closely planted in hedge form and still be effective after half a century.



Care

Fertilizing is often unnecessary, since the more hedges grow, the more often they will have to be sheared. However, if the soil is poor or a young hedge needs added stimulus to attain the desired height, a mulch of well-rotted manure can be placed around the base of the plants or worked into the soil. This can be done either in the fall or in the spring. A mixed fertilizer (5-10-5) could be applied at

the rate of 5 to 10 pounds for each 100 feet of row depending on the size of the plants. For old, mature plants it may be possible to make an even stronger application, but this should be done only after a previous trial application.

Most deciduous hedges can be treated far more ruthlessly than they have been. When they grow old and open at the base, it would be far better to cut them down to within a few inches of the ground than to try to force additional branches by the use of fertilizers and added care. The cold winter of 1933-34 clearly demonstrated this important point to many home owners. All privet hedges and even barberry hedges were injured in many sections of New England and New York. Other plants had their tops killed entirely. Most of these plants came up again from the roots, many of the hedges that were cut back to the ground in the early spring were more dense and more compact at the end of the first growing season than they had been for many years. Consequently, an old and worn-out deciduous hedge should be cut in the early spring before the buds begin to swell, leaving only a few inches growth at the base. A bushy, vigorous hedge will result in short order. This does not apply to evergreen hedges, for they frequently do not respond to such vigorous treatment.

Pruning at Planting Time

Many shrubs can be trimmed so that they will grow into good hedges. Various hedge demonstration plots are sufficient evidence that this is true. In the hedge demonstration plot at the Arnold Arboretum there are at least 80 of the 115 hedges which can be classed as good. Some kinds of plants require more trimming than others, but only those that are easily trimmed make good hedge plants. There are enough



Young white pine hedge just beginning to become dense

Prunus Laurocerasus used widely in the South makes a very dense, glossy-leaved hedge

of these to make hedge planting a very interesting and varied—part of landscape work.

Trimming should start with the very young hedge. Usually it is advisable to start with plants three feet or less in height, for such plants are easily trained to grow in proper hedge form. The ideal hedge plant is one that branches directly from the base, each branch being clothed with lateral branches from the ground to the top of the plant. This makes for a very dense habit of growth and a good hedge. Many plants do not have this form when bought from the nursery for they are frequently grown with a single stem or trunk, with many of the lateral branches removed. Such plants will grow satisfactorily, but the growth will be all at the top, and not at the bottom near the ground. It is in this area that the side branches must be forced while the plant is yet young, for as it grows taller and older, it becomes increasingly difficult to force adventitious buds at this point.

Consequently, it is usually a good practice, especially if all plants have been purchased, to cut off the tops of the hedge plants at six inches or a foot above the ground as soon as they have been planted. Admittedly this is very hard for most gardeners to do, for it means cutting off a great deal of what they consider "good specimens." However, a "good specimen" is not wanted in hedge making. A hedge plant is grown differently, as explained above, and the best time to start growing properly branched hedge plants is at the beginning.

Suppose a hawthorn hedge has been decided upon. Five-foot specimens are obtained from the nursery and when they arrive, it is noted that all are grown with a single trunk and no lateral branches on the trunk for the first two feet. If such plants are not

pruned at planting time, there may always be that two-foot space at the bottom of the hedge where there are no branches. In addition, the single trunk may become injured to such an extent that the entire top part of the plant may die. If these same plants are cut off at six inches or a foot above the ground as soon as they are planted, side shoots would be forced out from that part of the trunk remaining, or from the ground in such a manner that the plant eventually would have several main stems clothed with lateral branches from the ground on up.

Most of the deciduous shrubs and trees recommended for use in hedge making are of the type that will respond to such a severe type of pruning. I have cut off the trunks of such trees as beech, pin oak, sycamore, Norway maple, Lombardy poplar, the Asiatic elm and others—trees that were six to eight feet tall with a trunk diameter of at least two inches when they were received for hedge planting—cut them off six inches from the ground, and, during the first growing season, many buds were forced out from each trunk, so that they later developed into well branched bushy hedge plants.

Unfortunately, it is not often possible to treat evergreen hedge plants in this manner. They are slower in their habit of growth, and frequently seem unable to form new leaf buds on wood that is old or large and devoid of foliage. It is a good policy never to prune evergreens back to wood that has no leaves, for if this is done, the chances are that the branch or stub may die. In buying evergreen plants, for hedge making, it is essential to have them well branched at the base, thus avoiding a great deal of trouble later.

Shape

The shape of the hedge is very important, for many an otherwise good

hedge is spoiled because the owner tries to keep it too narrow at the base. In general, all hedges should be wide at the base and narrow at the top. This is especially true of evergreen hedges. Unfortunately, there are many Norway spruce hedges in this country which are excellent examples of how not to prune a hedge. It may be that they were planted too close to walk or road, then as they increased in height, they were clipped perpendicularly and were forced to grow within too narrow limits. When this is the case, the lower branches die because of lack of light and air and practically nothing will bring out new branches in their place. The result is a very poor hedge, open at the base and sometimes open as high as the eye level. Such hedges should be removed and replanted in such a way that the new plants will be allowed to grow nearly as wide, as the mature hedge is high.

Anyone familiar with pruning trees knows that it is usually the shaded inner branches which are weakest and often need to be cut out. Such is the case with hedges, especially with evergreens. Hence it is always advisable to trim them so that the lower branches receive some light, and this is most easily accomplished by having them wider at the base than at the top. There are certain vigorous growing hedge plants like the privets and the Japanese barberry, which, when growing in good soil can be trimmed with perpendicular sides and still remain well branched at the ground level. However, even these when growing in poor soil will make better hedges if trimmed so that the lower branches are wider or longer than the upper branches.

Personal preference dictates the actual shape of the finished hedge. Some like a more or less rounded hedge, others may prefer a triangular hedge with a flat top. This type is easier to

trim than the rounded form, but there is the possibility, in regions where the snowfall is heavy, that the rounded form may shed the snow better with less injury resulting to the plants.

When to Trim

Many a gardener has vigorous growing privet in mind when he thinks of trimming. Such plants grow so fast that they must be trimmed several times a season. However, all hedges are not like this. There are many which need be trimmed only once each year and some which only need trimming once every two or three years! It all depends on the age of the hedge, the kind of plant material and the general purpose for which the hedge is grown.

As has already been explained, the deciduous hedge is best cut to within six inches or a foot of the ground immediately after planting. The first year of growth the plants are left unmolested in order that they may make a maximum growth. The second year, some may need a heavy pruning, but most certainly all will need a pinching back of the branches in order to force lateral growth which makes for density. Especially is it important at this time to keep the terminal shoot or leader restrained. Trees like beech, maple and sycamore have strong leaders, and these must be restrained in order to make the plant become more dense at the base. If the leaders are not restrained at this early date, the plant will grow high rapidly, but lateral growth (which is necessary for dense foliage especially at the ground level) will be retarded. The third year of growth, most plants will need a normal trimming.

Evergreens should not be cut back harshly. Hence, the pinching back of terminal shoots is most essential in order to produce lateral growth. Most

evergreens have strong leaders, and these must be restrained in order to make the hedge become bushy. Once the small hedge has become fairly well filled in at the base, then it can be allowed to grow moderately in height.

The amount of growth to trim off depends on the kind of plants used and their age. For instance, one would expect to trim off more material from a privet or honeylocust hedge than one would from a boxwood hedge. If the plants have not reached the height at which they are to be permanently maintained, then more growth should be left on.

If the hedge has reached the height at which it will be maintained, then it may be trimmed back to within an inch (or less) of the previous year's growth. Even this is impossible to keep up indefinitely, for it is obvious that under this condition the hedge will still enlarge. Sometimes it is necessary to cut back to two-year or three-year-old wood. One should be very cautious in doing this, as some plants will not respond to such severe trimming as well as others, but a little experimenting on this score, with the particular type of hedge grown, will soon show whether or not this severe pruning can be done. With deciduous hedges, at least, it is usually possible to cut them back to near the ground level when they become overgrown, and thus a new hedge is started again.

A young hedge which has not yet reached its full height is best trimmed during the actual growing season in late spring, for as elongating shoots are pinched back, lateral buds are forced into immediate growth.

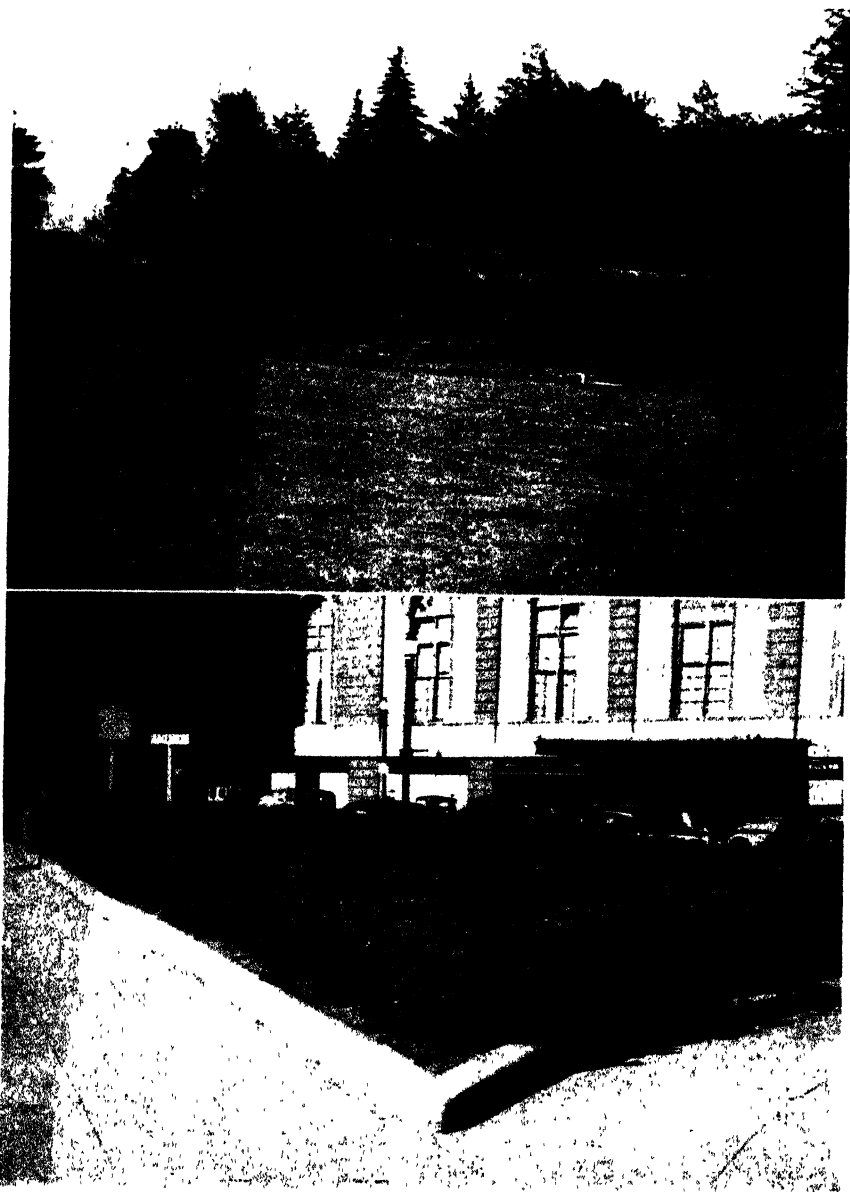
For the mature hedge, trimming can be done at any time, but during or immediately after the actual growing season is best. This is often in late June or very early July in the northern United States. At this time the growth

is over for a period at least and so on one trimming will suffice for a long period. Then, too, any further growth which takes place will have sufficient time to harden off before cold weather. If trimming is done in late July or August (in the northern United States) such young growth as is forced out may be too tender and so be killed during the winter, leaving unsightly dead spots in the hedge. Certainly any heavy trimming, especially that done to evergreen hedges, should be done in the spring. Shaded branches are frequently the least hardy, and a heavy fall trimming, resulting in the exposure of a number of shaded branches, might result in serious winter injury to the hedge, whereas the same heavy trimming given in the spring would leave plenty of time for young shoots to grow and harden off properly before winter. The same caution should be taken in heavily trimming a hedge just prior to a long hot, dry spell in the summer. Such a trimming had better be advanced a few weeks into late spring in order to allow new growth to develop and shade the most vulnerable spots.

Trimming once at the end of the growing season is usually sufficient for all but the most vigorous growing hedges such as privet, honeylocust and osage orange. It may be that a few shoots will grow and need trimming here and there before fall, but these would not be sufficient to necessitate a heavy trimming in the fall. In any event, the object of each and every trimming is to remove the terminal buds and so force lateral buds into growth, thus increasing the density of the foliage of the entire hedge.

Kinds of Hedges

The selection of the proper kind of plant material for the hedge will save much trimming. For instance, if it is



The hedge experiments on the grounds of the Experiment Station at Ottawa, Canada, include many hedges, some of which are fifty years old

Acanthopanax Sieboldianus or Five-leaved Aralia is one of the best hedge materials for growing in the very trying city conditions. Here is a hedge growing in the heart of downtown Boston opposite the Hotel Statler

desired to have a hedge four feet high, *Euonymus alata compacta* would be ideal, for, once established, it only needs a slight trimming *once every other year* or so. Privet, honeylocust, linden, beech, all need considerable pruning to keep them in proper form at this height. Some hedge materials that need little clipping are *Cornus racemosa*, *Taxus media Hicksii*, *Berberis Thunbergii erecta*, *Thuja occidentalis*, "Little Gem" and several others.

There are some plants used in flowering hedges such as forsythia, Chinese lilac, Van Houtte spirea, which are kept unclipped until the flowers have faded when they are given a single annual trimming. After this clipping the branches are allowed to grow untrimmed the rest of the year, resulting in branches a foot or so long by the end of the growing season; it allows sufficient time for the formation of many flower buds, so that in the spring these hedges are covered with long graceful shoots of flower clusters. Such hedges can only be considered as "formal" immediately after they are clipped. They do take up considerable space, hence their use is limited, but when fully clothed with flowers they are outstanding indeed.

In completing this discussion, one other possibility should be presented. A Canada hemlock hedge can be one of the most beautiful of clipped hedges, or it can be allowed to grow for a year or two without any clipping and become one of the most graceful of the informal or unclipped types. The long, arching branchlets which grow quickly in a year or two will easily be two feet long and lend a very beautiful and graceful effect to the entire hedge. When they grow out of proportion, then they may be sheared off and the hedge once more becomes "formal." In this way a hemlock hedge (and some others likewise) may be "formal" or "informal" at the

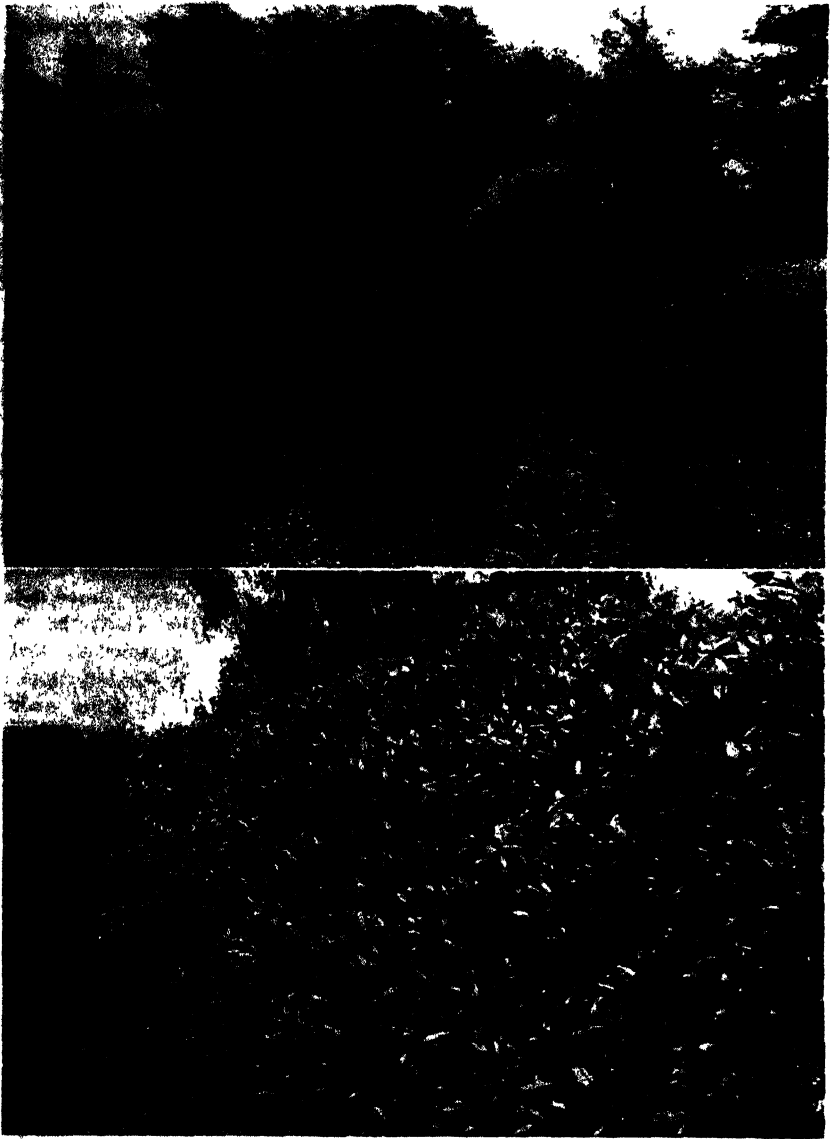
owner's whim, thus affording a landscape feature which is very natural. Yields varied in some years.

Hedges for

Accompanying this list of 184 plants making good hedges in all parts of the country, some can be used except the extreme south. And green hedge plants. particular subjects possible in the information. large group of

The method is merely a list and a recording name showing which that particular plant may best be put. It should be ~~stated~~ ^{stated} here that all the plants listed (with the exception of some recommended for shelterbelt planting) can be used in clipped hedges. Those listed as ~~dense~~ ^{dense} make the best clipped hedges. Plants which have been found to be unsatisfactory in hedge making for particular reasons are not included. One example is the Mugo pine, which really makes an excellent low clipped hedge, but is susceptible to scale infestation and has been eliminated from this list. An example of a plant with which one should be very careful is *Ribes alpinum*. The staminate form does not carry the white pine blister rust. The pistillate form does and should not be used. Both forms make excellent low clipped hedges.

Hardiness is a topic which had to be entirely omitted. The reader will have to rely on his own knowledge for this. *Abelia grandiflora* makes a marvelous hedge, evergreen in some sections of the South and deciduous in others, but not satisfactorily hardy north



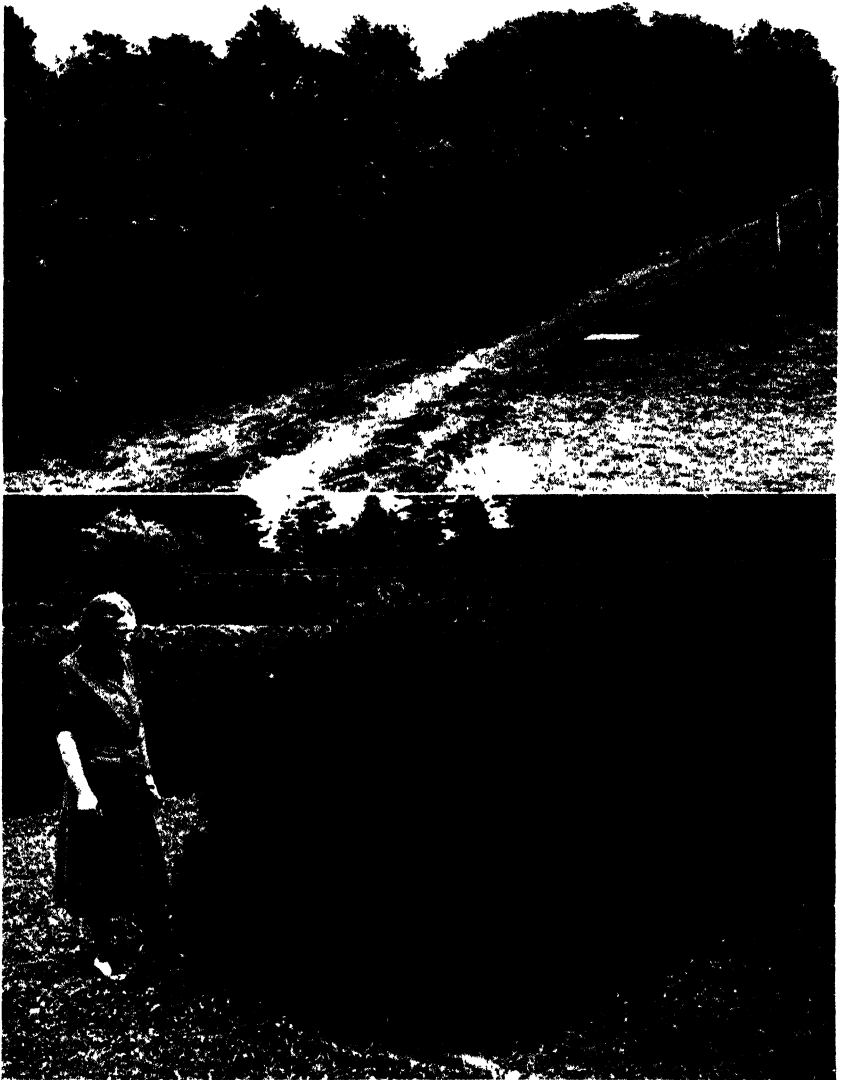
Two types of pruning. The hedge on the left being wider at the base usually results in a hedge with dense branches all the way to the ground. Notice how the larger hedge, trimmed with perpendicular sides, has no branches whatsoever touching the ground. This could have been corrected if it had been trimmed so that it was wider at the base than at the top

Quercus imbricaria, Shingle oak, makes an excellent dense hedge. Its glossy, green leaves turn to a golden brown very late in the fall

of New York City. Everyone knows the meritorious characters of *Buxus sempervirens* as a hedge but some may be unfamiliar with the fact that *Ilex crenata convexa* is the best substitute for this in New England. Many such interesting items as these have had to be omitted, but it is hoped that the list of plants and a few of the purposes for which hedges are planted, as given, will be sufficiently stimulating to the reader so that in making his own selections from them, he will use every precaution in determining the hardiness and the best growing conditions of the plants he selects.

The numbers after the plants in the following lists will refer to the following general groups:

1. **Evergreen:**—Plants in this group keep their leaves most of the winter in those regions where they are normally used.
2. **Dense:**—Plants in this group grow dense foliage with a minimum amount of care. These naturally make the best hedges.
3. **Thorny:**—Either stems or leaves thorny, making good barrier hedges.
4. **Low:**—Can be grown as very low hedges with a minimum amount of clipping.
5. **Flowering:**—Because of profuse flowers, these hedges can be grown as informal flowering hedges, with trimming once a year (or even once every other year if desired.)
6. **Colored Fruits:**—Trimming removes the majority of the flowers and fruits, yet the plants in this group have so many bright colored fruits that, with the right trimming, some fruits will remain to give color and interest.
7. **For Poor Growing Conditions:**—Some hedges must be planted where growing conditions are difficult and plants in this group may succeed where the others would fail.
8. **Narrow, Columnar and Upright:**—Naturally growing this way, not all make good hedges for the terminal growth is so strong that often it is difficult to force lateral branches at the ground level.
9. **For trying situations in the Mid-west:**—A special group found to be best suited to the extreme heat, cold and drought conditions of the mid-west.
10. **Windbreaks and Screens:**—A special group of tall-growing vigorous plants, many of which are not suited for low, clipped hedges but which will grow rapidly into a windbreak or screen and can be kept clipped or unclipped.
11. **For the coldest parts of the United States and Southern Canada:**—These plants should be used in the coldest parts of the country where most of the other plants listed may be injured by the extreme cold.
12. **For Shelterbelts on the northern Great Plains:**—Plants for a particular type of windbreak in a very difficult area. Many plants in this group will not make low clipped hedges, and are only mentioned here for this special type of windbreak.
13. **For Southern Gardens:**—The farther south one goes, more kinds of plants can be used. Many not listed in this group will do very well in the South. Most of those in this group are not reliably hardy north of Philadelphia. (*Tsuga caroliniana* is an exception).



Syringa Prestonia as it is grown at the Experimental Farm in Ottawa, Canada, makes an excellent flowering hedge. This particular one is not clipped and it is easily seen that because of the uniform growth of the plants, it makes an ideal "informal" flowering hedge.

White pine does form a good hedge when it is properly clipped. It is one of the most difficult plants to clip properly

List of Hedges for the United States and Canada

(Except the Subtropical Areas)

- Abelia grandiflora* 5, 13
Abies concolor 1, 2
Acanthopanax Sieboldianus 2, 3, 7
Acer campestre 2
Acer Ginnala 2, 10
Acer negundo 12
Acer platanoides 10
Acer platanoides columnare 8, 10
Acer platanoides Schwedleri 10
Acer rubrum columnare 8, 10, 11
Acer sacharum monumentale 8, 10, 11
Amelanchier alnifolia 12
Aronia arbutifolia 6
Berberis aggregata 2, 3, 6
Berberis buxifolia 1, 2, 3
Berberis buxifolia nana 1, 2, 3, 4
Berberis circumserrata 2, 3, 6
Berberis Darwinii 1, 13
Berberis dictyophylla albicaulis 2, 3, 6, 13
Berberis Gilgiana 2, 3, 6
Berberis Julianae 1, 2, 3
Berberis koreana 2, 3, 6
Berberis mentorensis 2, 3, 6
Berberis stenophylla 1, 2, 3, 13
Berberis Thunbergii 2, 3, 6, 7
Berberis Thunbergii erecta 2, 3, 4, 6, 7, 8
Berberis Thunbergii minor 2, 3, 4, 6, 7
Berberis triacanthophora 1, 3
Berberis verruculosa 1, 2, 3
Berberis vulgaris 2, 3, 6, 7
Berberis vulgaris atropurpurea 2, 3, 6, 7
Betula populifolia 2
Buxus microphylla japonica 1, 2, 4
Buxus microphylla koreana 1, 2, 4
Buxus sempervirens and vars. 1, 2
Buxus sempervirens suffruticosa 1, 2, 4
Caragana arborescens 7, 9, 10, 11
Carpinus Betulus 2, 8, 10
Celtis occidentalis 11, 12
Chaenomeles japonica 2, 3, 4, 5
Chaenomeles lagenaria 2, 3, 5, 7
Chamaecyparis pisifera vars. 1, 2
Cornus alba 6, 11
Cornus mas 2, 6
Cornus racemosa 2, 6, 7
Cotoneaster lucida 4, 6
Crataegus crus-galli 2, 3
Crataegus Oxyacantha 2, 3
Crataegus Phaenopyrum 2, 3, 6
Cryptomeria japonica Lobbii 1, 2, 8, 13
Cupressus sempervirens, 1, 2, 8, 13
Elaeagnus argentea 11, 12
Elaeagnus angustifolia 3, 7, 9, 12
Euonymus alata 6
Euonymus alata compacta 2, 4, 6
Euonymus Fortunei radicans 1, 4
Euonymus Fortunei vegeta 1, 4, 6
Euonymus japonica 1, 2, 13
Fagus grandifolia 2, 10
Fagus sylvatica fastigiata 2, 8, 10
Forsythia intermedia and vars. 5
Fraxinus pennsylvanica lanceolata 11, 12
Gleditsia triacanthos 12
Hibiscus rosa-sinensis 1, 5
Hibiscus syriacus 5
Hippophae rhamnoides 3, 6, 7
Hydrangea arborescens grandiflora 5
Hydrangea macrophylla 5, 13
Hypericum species 4, 5
Ilex aquifolium 1, 3, 6, 13
Ilex cornuta 1, 3, 6, 13
Ilex crenata and vars. 1, 2, 13
Ilex vomitoria 2, 6, 13
Juniperus chinensis and vars. 1, 2, 6
Juniperus scopulorum and vars. 1, 2, 6, 8, 10, 12
Juniperus virginiana and vars. 1, 2, 6, 8, 10, 11, 12
Lagerstroemia indica 5, 13
Larix laricina 11
Ligustrum amurense 2, 4, 5, 6, 7
Ligustrum japonicum 1, 2, 4, 6, 7, 13
Ligustrum lucidum 1, 2, 4, 6, 13
Ligustrum obtusifolium Regelianum 2, 4, 5, 6
Ligustrum ovatifolium 2, 4, 5, 6, 7, 13
Lonicera fragrantissima 2, 6



The Canadian hemlock eventually makes a splendid hedge. Here are young plants recently set out which will grow together to form one continuous mass of foliage.

A Canada hemlock hedge on the campus of Vassar College. Note the exquisitely dense foliage.

- Lonicera Maackii* 2, 6
Lonicera Maackii podocarpa 2, 6, 10
Lonicera nitida 2, 4, 13
Lonicera tatarica 2, 5, 6, 7, 9, 12
Maclura pomifera 2, 3, 7, 9, 10
Mahonia aquifolium 1, 3, 5, 6
Mahonia Fremontii 1, 3, 5, 6, 13
Morus alba 10, 13
Myrica cerifera 1, 6, 13
Myrtus communis 1, 2, 5, 13
Nerium oleander 1, 5, 13
Pernettya mucronata 1, 2, 4, 13
Philadelphus coronarius 5, 7
Philadelphus Lemoinci "Avalanche" 2, 5
Philadelphus Lemoinci erectus 2, 5, 8
Physocarpus intermedius parvifolius 2, 9
Physocarpus monogynus 7, 9, 11
Physocarpus opulifolius and vars 7, 11
Physocarpus opulifolius nanus 2, 4, 7, 11
Picea Abies 1, 2, 10
Picea Abies Maxwellii 1, 2, 4
Picea glauca 1, 2, 9, 10, 11, 12
Picea glauca conica 1, 2, 4
Picea Omorika 1, 2, 10
Picea orientalis 1, 2
Picea pungens and vars. 1, 2, 9, 11, 12
Pinus nigra 1
Pinus resinosa 1, 10, 11
Pinus Strobus 1, 2, 10
Pittosporum Tobira 1, 2, 13
Poncirus trifoliata 3, 7, 13
Populus alba 7, 9, 10, 11, 12
Populus alba pyramidalis 7, 8, 9, 11, 12
Populus berolinensis 10, 11, 12
Populus laurifolia 10
Populus nigra italica 7, 8, 9, 10, 11, 12
Populus Simonii 7, 9, 10, 11, 12
Populus tremuloides 10, 11, 12
Prinsepia sinensis 2, 3, 11
Prinsepia uniflora 2, 3
Prunus americana 12
Prunus Laurocerasus and vars. 1, 2, 10, 13
Prunus tomentosa 5, 6
Prunus virginiana 11, 12
Pseudotsuga taxifolia 1, 2, 9, 10
Pyracantha coccinea Lalandii 2, 3, 5, 6, 13
Pyracantha crenulata 1, 2, 3, 5, 6, 13
Quercus Ilex 1, 2, 10, 13
Quercus imbricaria 2, 10
Quercus macrocarpa 11, 12
Quercus palustris 10
Quercus phellos 2, 10
Quercus robur fastigiata 8, 10
Quercus virginiana 1, 2, 10, 13
Raphiolepis umbellata 1, 13
Rhamnus cathartica 2, 3, 7
Rhamnus Frangula 2, 6, 10, 11
Rhododendron obtusum amoenum 1, 4, 5
Ribes alpinum (staminate form) 2, 4, 9, 11
Rosa multifolia 2, 3, 5, 6
Rosa rugosa 2, 3, 5, 6, 11
Rosa setigera 3, 5, 6
Rosa virginiana 3, 5, 6, 11
Salix alba 11, 12
Salix pentandra 12
Spiraea arguta 5
Spiraea prunifolia 5
Spiraea Thunbergii 5
Spiraea Vanhouttei 2, 5
Syringa chinensis 5
Syringa Josikaea 2, 5, 10, 11, 12
Syringa persica 5, 9
Syringa villosa 2, 5, 10, 11, 12
Syringa vulgaris 5, 9, 10, 11, 12
Tamarix odessana 5, 13
Tamarix parviflora 5, 13
Tamarix pentandra 5, 13
Taxus baccata and vars. 1, 2, 6, 13
Taxus baccata erecta 1, 2, 6, 8, 13
Taxus baccata fastigiata 1, 2, 6, 8, 13
Taxus baccata repandens 1, 2, 4, 6
Taxus canadensis stricta 1, 4, 6
Taxus cuspidata 1, 2, 4, 6, 8
Taxus cuspidata nana 1, 2, 4, 6
Taxus media Hicksii 1, 2, 4, 6, 8
Thuja occidentalis 1, 2, 8, 10
Thuja occidentalis "Douglas pyramidalis" 1, 2, 8, 10
Thuja occidentalis "Little Gem" 1, 2, 4
Thuja occidentalis robusta 1, 2, 10
Thuja orientalis and vars. 1, 2, 10, 13

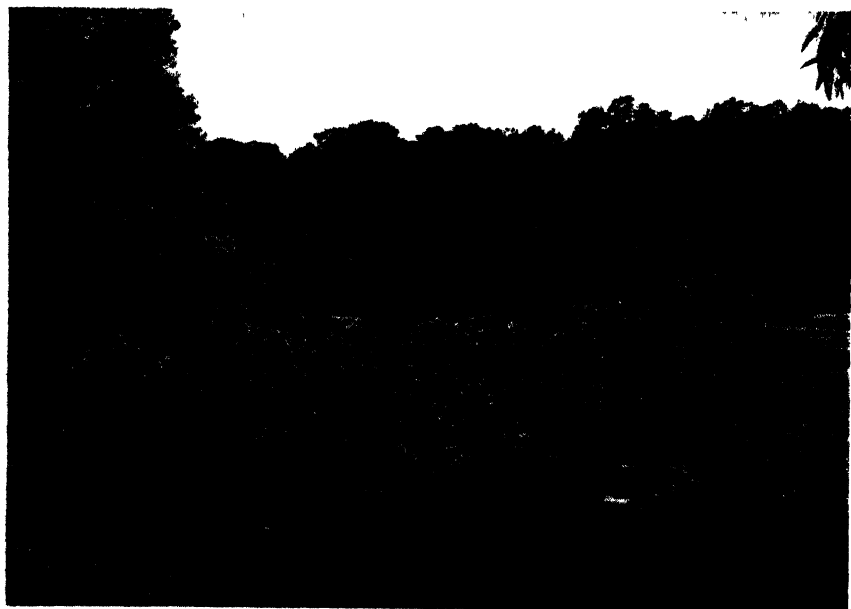


A Japanese yew hedge is one of the best of evergreens for this purpose and may be maintained from one foot or so to cover ten feet in height.

An eight-foot yew hedge in Wellesley, Massachusetts

Tilia cordata 10
Tsuga canadensis 1, 2, 10
Tsuga caroliniana 1, 2, 10, 13
Ulmus pumila 2, 7, 9, 10, 11, 12
Viburnum dentatum 6

Viburnum lantana 2, 6
Viburnum lentago 2, 6, 11
Viburnum Opulus nanum 2, 4
Viburnum prunifolium 1, 2, 6, 10
Viburnum tinus 1, 13



The native rose, *Rosa virginiana*, grown in the Arnold Arboretum as an unclipped flowering border. Unfortunately, it is usually not sufficiently dense to crowd out all grass and weeds so that some hand weeding must be done to maintain it properly

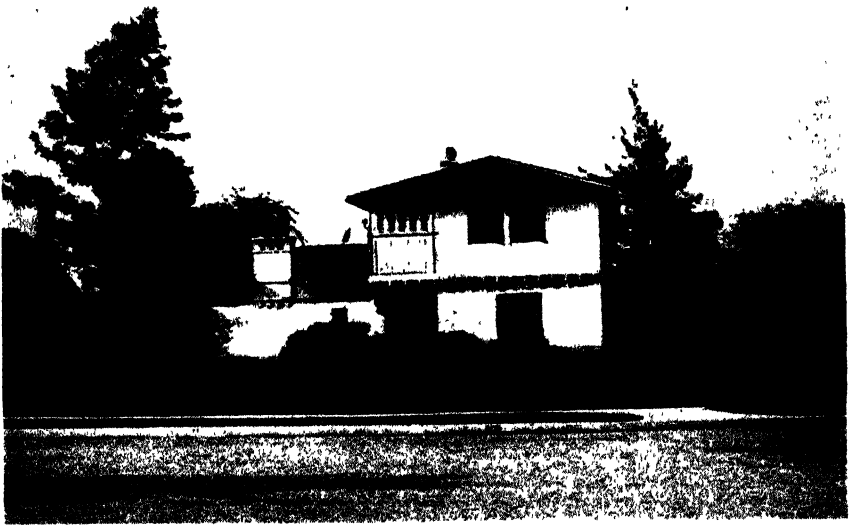
Evergreen Hedges for the Extremely Warm Parts of the United States (Southern Florida and Southern California)

Dwarf

Berberis buxifolia nana
Buxus microphylla japonica
Buxus sempervirens suffruticosa
Cuphea hyssopifolia
Euonymus japonica microphylla
Lonicera nitida
Myrsine africana
Punica Granatum nana

Medium

Acacia armata
Acacia longifolia
Acacia verticillata
Berberis Darwinii
Berberis pruinosa
Berberis stenophylla
Berberis xanthoxylon
Carissa edulis



In the South, Hedera Helix, the English Ivy, is frequently grown over wall or fence to make an interesting creeper. (Los Angeles, California)

Carissa grandiflora
Diosma ericoides
Escallonia macrantha (in trade as *E.*
rubra)
Escallonia Rockii
Eugenia uniflora
Euonymus japonica
Feijoa Sellowiana
Grevillea Thelemanniana
Griselinia lucida
Hebe buxifolia
Hebe cupressoides
Hebe elliptica
Hebe Traversii
Ilex aquifolium
Ilex cornuta
Ilex crenata
Lantana Camara
Leptospermum laevigatum
Ligustrum japonicum
Mahonia aquifolium
Mahonia Nevini
Mahonia pinnata
Myoporum acuminatum
Myrtus communis
Myrtus Ugni
Osmanthus aquifolium
Pittosporum Tobira
Psidium Cattleianum
Rhamnus alaternus
Rhamnus californica
Teucrium fruticans
Viburnum suspensum
Viburnum tinus
Viburnum tinus lucidum

Tall Broad-leaved Evergreens

Buxus balcarica
Buxus sempervirens
Catha edulis
Ceratonia Siliqua
Cocculus laurifolius
Coprosma Baueri
Coprosma robusta
Dodonaea cuneata
Duranta repens
Eucalyptus polyanthemus
Eugenia paniculata
Eugenia paniculata australis
Eugenia Smithii
Ligustrum Henryi
Ligustrum japonicum
Ligustrum lucidum
Ligustrum ovalifolium
Metrosideros robusta
Myrica californica
Olea europaea
Phillyrea latifolia media
Pittosporum crassifolium
Pittosporum eugeniioides
Pittosporum tenuifolium
Pittosporum undulatum
Pittosporum viridiflorum
Prunus caroliniana
Prunus ilicifolia
Prunus Laurocerasus
Quercus agrifolia
Quercus chrysolepis
Quercus Ilex
Quillaja Saponaria

Conifers for Tall Hedges

Chamaecyparis Lawsoniana
Cupressus macrocarpa
Libocedrus decurrens

The Decorative Onions

HELEN M. FOX

Some of the decorative alliums are exquisite in their daintiness and come in charming hues. *Flavum*, *pulchellum*, and *caeruleum* brighten the rock garden when the spring refulgence has become dimmed; while *glaucum*, var. *senescens*, with its silvery pink blossoms, is harmonious with the greys in the rock garden as is the grey-white *tuberosum*. Here in North America the native onions form part of the colorful spring tapestry of western meadows along with brodiaeas, calochortus, cannassias and erythroniums or are found springing up in woods.

Though almost all people in the whole world like the flavor of onion in their food, the odor is not popular in gardens. Gardeners describe the odor of allium with unpleasant adjectives and nouns and bar it from the garden. It is true all flower garden alliums with few notable exceptions, such as *tuberosum* and *flavum*, smell like their cousins, leek and garlic. Even the enthusiast for the decorative members of the allium family must admit it would be unpleasant to have a whole garden smell of them, yet a whiff here and there between the spice of carnation, the tang of savory and sweetness of the rose has the virtue of contrast. Moreover, with a few exceptions, onions do not give off their smell without first being touched. However people who do not know the decorative onions are always surprised when told they are cousins of the leek and it is the smell that convinces them, so it has its place.

The onion family increases rapidly under cultivation and many species are so hardy they are likely to become

pests, but it is a simple matter to dig up superfluous clumps. Just the same, as with all plant collecting, it is difficult to procure certain species. So often a form of something already present in abundance comes up when a rarity has been ordered and waited for with breathless suspense. This is one of the hazards of eclectic gardening that causes the final attainment of a rare species to be all the more appreciated.

Many species alliums bloom the second summer after being sown and some are biennial and have to be renewed from seed and almost all of them can be increased by dividing the clumps. Instead of ripening seeds, some of the onions form little bulblets where the flowers should be. If these bulblets are planted, the new plants will in all likelihood again bear a harvest of knotty, green lumps instead of flowers. So beware of these

The comparatively few species grown by me did not seem sufficient for an article to interest the public so I have searched among other gardeners to find onions they thought attractive and have consulted the following authorities among whom is Louise Beebe Wilder, who in her book, *Adventures with Hardy Bulbs*, records a thorough piece of research as well as her experiences in growing many of the bulbs herself. In addition, for American onions I consulted notes in Ira N. Gabrielson, *Western American Alpines*; Joseph E. Harned, *Wild Flowers of the Alleghanies*; Leslie L. Haskin, *Wild Flowers of the Pacific Coast*; and Anderson McCully, *American Alpines in the Garden*. For European onions Hippolyte J. Coste, *Flore des-*

criptive et illustrée de la France, de la Corse, et des contrées limitrophes was consulted; and for scant but accurate notes Clarence Elliott, Rock Garden Plants; as well as Reginald Farrer, The English Rock-Garden; and of course L. H. Bailey, Hortus; as well as The Herbarium and botanical literature at the New York Botanical Garden.

Onions grow wild over the northern hemisphere. The slender spears rising from bulbous roots are among the earliest greens to appear in woods and meadows in spring. Later in the season, stems grow up bearing umbels either round or flat, full or sparse, with more or less colorful flowers. Certain wild onions besides *Allium Cepa*, the usual table onion, leek, garlic, chives, Welsh onions and ciboule have been gathered for food. Some of the wild onions are sweeter than others but this article is concerned only with the decorative members of the family.

There are some charming native American onions. Among the North Western species is the handsome *Allium acuminatum*, Hooker's onion, often so prevalent it is like a weed in dry sandy soil, in sage brush slopes and open meadows from British Columbia to Idaho and California. It is undoubtedly hardy as is true of so many western plants, only where there is no winter wetness. The bulb coats are netted, the flower stem 8-15 inches high and near its base grow the short leaves. The flower heads are in good proportion to the scape which is one reason the plants are so good looking. The umbel is composed of numerous bell-like flowers with the tips of the segments slightly reflexed, colored purple, varying to soft pink and on stalks slightly longer than the perianths. According to Ira N. Gabrielson they cover mountains and plains with the purple mist of their bloom in June and

July. Two papery bracts of iridescent pink and white enclose the flower clusters before they open. As the blossoms age they fade to a lighter tone. They last long after being cut and those left standing in pastures and along hill-sides retain their bright color after the summer grasses have dried.

Also from the North West, Washington, Colorado and south to New Mexico and Texas, grows *Allium Geyeri*, a woodland onion partial to high altitudes. The bulbs have fibrous coats, the leaves are very narrow and two-thirds the length of the scape which is about 10 inches or more high. From June to September the heads of blossoms tinted rose, some say flesh colored with broad, oval segments and awl shaped filaments, are born on fleshy pedicels a little longer than the flowers.

From the same region and similar to *Geyeri* is *Allium falcifolium*, only that it grows in full sun, blooms the end of May and has very differently shaped leaves. These are 6 inches or so long and twist along the ground as do leaves of some species of tulips. The flat scape carries an umbel of purple-tinged-pink blossoms, held erect, with prominent white anthers not longer than the sepals which are slightly reflexed. The leaves disappear before the flowers mature.

A species partial to dry hillsides growing in coarse granite sand in California and Nevada, is *Allium atrorubens* with a habit of sending up one leaf only. The scape is 5 inches high with umbels almost 2 inches across, composed of stalks the same length as the flowers, which are reddish, tinged with a deeper purple tone.

An upland bog plant is *Allium brevistylum* blooming in June in the high mountains of Utah, Wyoming, Montana and Colorado. The rootstock ends abruptly and is crowned by one or

more bulbs with many dead coats. The scape is 1-2 inches thick, and obscurely winged. The narrow leaves are half as long as the scape, which is from 12-15 inches and carries a showy umbel of roseate pink, born on pedicels twice their length. The filaments are deltoid at their bases. Since it requires moisture *brevistylum* might be grown at the edge of streams.

In California and lower California grows the fairly tall *Allium unifolium*, which is probably not hardy. It is described as 2 feet high with bright umbels of many fairly large rose pink flowers borne on pedicels twice their length. The leaves are shorter than the scape.

According to Leslie L. Haskin, *Allium attenuifolium* of the Pacific Coast is the most beautiful of wild onions and grows in many types of situations, thought another writer, Anderson McCully, says it needs dry soil and sun. The outer coats of the small, round, truncated bulbs are marked with tiny V's on the network. Two radical grass-like leaves with scabrous margins sheath the base of the scape, but leave it close to the ground. The scape is round, about 1 foot high, smooth and glaucous and minutely speckled. A photograph of the plant in Mr. Haskin's book shows a globe-shaped crowded umbel with 50 or more flowers, each with sepals separated and star-like. The flowers are described as campanulate-rotate. The stamens are as long as the sepals and in color the blossoms vary from white to bright pink.

In April in the Mojave desert and nearby mountains and also in San Bernardino County of California, *Allium fimbriatum* grows abundantly and is said to be one of the outstanding attractive Westerners. Since it grows in hot dry situations it is not likely to be hardy where winters are wet, drainage poor or cold intense. The thick bulb

coats have rectangular markings; there is a thin solitary leaf longer than the scape which is not higher than 2-8 inches. When the scapes are their shortest the crowded deep rose to purple umbels are sometimes as big across as their support is high. Flower stalks are twice as long as segments while stamens are shorter than sepals. Even in a dried state on a herbarium sheet, the plant looks charming, partly because of the large size of the umbel in relation to the stem.

Another low growing onion, *Allium Nuttallii*, frequently not over 5-6 inches high, sometimes reaches 10 or even 15 inches. It blooms from March to June in rocky prairies from Texas and Arizona to South Dakota. The bulb has a reticulated coat, there are a few slender leaves growing from the base of the scape, while the umbel is few flowered, dainty and colored rose or white.

Six onions have grown particularly well in my garden in southern New York and can be recommended for their beauty and hardiness. *Cernuum*, *senescens* var. *glaucum*, and *tuberosum* increase yearly while *flavum* and *pulchellum* are biennial. *Cacruleum* has not been as long lived.

Almost unique along onions because of the sweet fragrance of their flowers are *tuberosum* and *ramosum*. Formerly both came under the heading of *odorum*. They are native to Northern Asia. In Hortus, Dr. Bailey says *ramosum* is distinguished by having hollow leaves, shorter than the scape, the white flowers have a reddish midrib and pedicels 2-3 times as long as the segments. Of *tuberosum* he says it differs from *ramosum* in not having hollow leaves and that the flowers are expanded instead of funnel form, the segments reflexed and marked with an inconspicuous greenish midrib. From seed I have grown plants to 2 feet high which quickly form large clumps and

bloom from July to September and bear umbels of starry white blossoms, but look grey white from the distance. I find them handsome because the grey-like blossoms standing on their tall stems form accents among the greys of herbs such as artemisias and lavenders and as a cut flower they are charming with red foliage plants and pink annuals. I call these plants, which came to me as *odorum*, *Allium tuberosum*, because the leaves are not hollow, the flowers are expanded and on the back of each segment is a greenish lavender line. The bulbs of this onion are cream white with a thin brown sheath. The grey-green leaves of different lengths are linear, thick and all joined, one inside the other and stand up to 1 foot or a little more like flat narrow green ribbons and are $\frac{1}{8}$ inch across. The flower umbel, $2\frac{1}{2}$ inches, is subtended by a paper like bract, and carries about 40 flowers, $\frac{1}{2}$ an inch across on stalks of 1 inch or so. When examined closely the flowers are greenish-white, have pointed sepals, and the anthers are brown when ripe. The flowers ripen quickly but other umbels keep coming along so the bloom lasts fairly long. To me, as well as to Mrs. Wilder, the blossoms have a fragrance reminiscent of heliotrope, but only if one smells them without touching, for as soon as this happens, the odor of onion pervades the air.

Spread over the whole of North America and variable in height, shape of leaves and color of flowers, is *Allium cernuum*. The narrowly clustered bulbs are oval at the base and have reticulated coats, tinted tan-rose. Plants growing in Rocky Mountains have narrow channelled leaves while in the East they are broad and flattened. My seed came from the West so the leaves are slightly concave, and narrow and from $\frac{1}{4}$ inch high. They are pointed at the apex and held in place by brown ma-

genta bracts. They cluster around the base of the scape and all leave it at the same point about 1 inch above the ground. The tallest and biggest plants 12-18 inches high come from Virginia and the Middle West. The scape is ridged, $\frac{1}{8}$ inch wide, flat and two-sided. In my garden the bell-like flowers $\frac{3}{8}$ inch long bloom in September, in the Middle West from July on to September. They grow in nodding umbels on dark, green pedicels $\frac{1}{2}$ an inch or more long. The 3 inner segments are shorter than the outer. The color has been described as rose lavender, but in mine the buds begin pale green, then are overcast with violet and lastly open to a lovely tone of pale pink. The whole inflorescence is graceful and lasts a long time in flower.

In contrast to all the pinks are 2 yellow onions, *Allium flavum* and *Allium Moly*. I have never been able to procure Moly though I have sent repeatedly for seeds and bulbs. It comes from southern Europe, is hardy and has been an old world garden plant for centuries. The bulb is ovoid, the leaves are 2 inches wide, and the flowers golden yellow with the perianth enclosing the ovary. A sketch of the plant in Coste's book shows it to have few-flowered umbels of starry flowers.

Also from southern Europe, comes the exquisite *Allium flavum* forming dainty clumps in the flower border or rock garden and blooming in July in full sun with flowers fragrant of lily-of-the-valley. The brittle glaucous blue-green scapes, 1 foot high, grow out of long hollow or semicircular leaves that envelop the base. Before the umbel emerges it is enclosed in an ecru paper-like ribbed envelope. After the envelope opens the tips of it, like 2 insect feelers, turn down and a cluster of tiny yellow bells appear, born on stalks of different lengths, yellow in color but with a green tinge. The bells

hang down or stand up with the still unopened buds among them and give the effect of a minuscule windblown fountain. The umbel measures 3 inches across, each floret $\frac{3}{16}$ inch. Stamens and pistils protrude beyond the flowers. The whole umbel, because of the pointed feeler-like tips of the bracts, seems to be in motion. *Flavum* sets seeds readily and a new batch is grown every year.

Except for its color, *Allium pulchellum*, from southern Europe and western Asia, is very like *flavum*. In my garden it blooms in July and August and is renewed from seed. The scapes are 1-1½ feet high, glaucous, blue-green as are the leaves which clasp the stalk at the base and are rounded at the tips. The flower head is fountain-like, more dome shaped than in *flavum*, and opens out of two spathe-like leaves, one shorter than the other which persist and stand out at fantastic angles. The umbel is 4 inches high and 2½ inches across. The stalks are colored like the flowers, a roseate lavender or, according to Ridgway's Color chart, "mallow purple" shaded "phlox purple." The effect is a Victorian color, a dusty light plum. There is no scent until the flowers are touched and then . . . !!!

The scape and umbel of *Allium caeruleum*, formerly called *azureum*, and coming from Siberia and Turkistan, is bright steel blue, a most unusual color. In shape, the plants resemble chives. The triangular leaves are yellow green, long and linear and lower than the scape and grow almost parallel to it. In my garden plants were 18 inches high but Dr. Bailey says they grow to 4 feet. Sometimes two flower stalks grow out of one spathe. The rounded umbel is 1¾ inches across, "greyish violet blue" is the color of the segments but the presence of many unopened buds on green

stems gives a slaty tone to the whole. The stalks of fully open florets are violet tinged and much longer than the blossoms which are ¼ inch across. A dark line runs down the centre of the segments. Though unpleasant to record, the flowers smell of a combination of onion and perspiration. They bloom in June and are handsome to have in a distant corner perhaps close to pink beebalm where the scent will quiet the hard effect of the onion, and the colors delight the eyes.

Coming in August and September and therefore doubly welcome, is *Allium senescens* var. *glaucum*. The bulbs are ¾ inch or more across, tinted purple, with a thin integument and form thick clumps in a few years. The leaves grow in clusters, are concave twisted, as if made of two thicknesses, about ¼ inch across and 12 inches or less long. The scapes are ridged and hollow and rise to 2 feet carrying heads of dusty lavender or mauve pink. In the var. *glaucum* the flowers are more campanulate and the umbels denser than in the type. The umbels of my plants measure about 2 inches across and are spherical. The pedicels are longer than the flowers which measure ¾ inch across. These flowers open violet and fade to pale pink and give the effect of being "pale amparo purple." The anthers are dark lavender before the pollen ripens when they turn yellow and since they project beyond the flowers they help color the whole umbel as well as to give it a feathery lightness. The plants are odorless until they are touched.

Two south European onions to be grown where the climate is warm and dry sound entrancing. The first *Allium narcissiflorum*, also known as *pedemontanum*, is described as the showiest of the family with nodding fairly large flowers of brilliant purple born on scapes 1 foot high. It blooms

in July in limestone mountains of south and eastern France and north western Italy. The roots make large clumps and are covered with dense fibre. The upstanding leaves are strap-like, broad, numerous and 6-9 inches high. They sheath the base of the scape and leave it at the same point about $\frac{3}{4}$ inches from the ground level. The flowers 2-10 in an umbel, grow on short pedicels and are companulate, shaped somewhat like *Campanula carpatica* with points at the center of the wide segments which overlap at their bases. Each flower measures from $\frac{3}{4}$ to $\frac{1}{2}$ inch across.

The other south European onion, *Allium Neapolitanum*, also called album-santi, blooms from March to May. Before the war it was picked, tied into bunches and exported to England for decoration. The plants smell faintly and the flowers, in loose heads, are shaped like open cups with wide obtuse segments overlapping at the base. The bulbs have numerous coats, the leaves are flat and wide, oval-obtuse at their tips and similar to daffodil leaves. They are almost as high as the scape which rises to 1 foot and are rough on the margins. The flower pedicels are all the same length and 3

times as long as the blossoms. Stamens and pistils are enclosed in the perianth.

The giant onions are so striking they draw the eye from every other plant in the garden and for that reason I have never grown them. But they are planted oddly enough in rock gardens or along stream beds far enough away not to get their roots wet. The hardy *Allium albopilosum* from mountain regions in north Persia and westward in Asia Minor flowers in mid June, with scapes reported 3 feet high. The leaves $1\frac{3}{4}$ inches wide are hairy on their under surfaces, and strap-like. The umbels are huge, from 8-1 inches across, and composed of starry lilac flowers which Mrs. Wilder says have a metallic sheen. The pedicels are 2-3 times as long as the perianths.

From the Himalayas comes the giant of them all, rising to $4\frac{1}{2}$ feet, *Allium giganteum*, with leaves 2 inches wide, likely to lie on the ground and a scape bearing globes of bright lilac flowers.

This ends the account of onions with blossoms qualifying them to an honored place in the garden. The ones described are not all hardy in cold, or wet regions, but there are enough pretty onions for every gardener who so chooses to have a variety of them.

Primula Poisoning

WALTER C. BLASDALE

Primula obconica was introduced into England from China in 1800 and soon became a popular house plant, although much inferior in its ornamental features to the plant now sold by florists under that name. It reached the United States shortly thereafter and attained popularity within an even shorter interval. In 1888 there appeared in the May issue of *Garden and Forest* (11) an article by James C. White of the Harvard Medical School, author of a book on *Dermatitis venenata*, in which he reported that he had been consulted by a Boston florist regarding an annoying rash which afflicted him and certain of his employees. Since the only plant recently added to those sold at this establishment was *P. obconica* this species was assumed to be the probable cause of the rash. The victims of it soon recovered. In February of the following year Mr. White reported in the same *Journal* that an equally troublesome outbreak of the same rash had appeared at the same establishment, which followed the handling of a second consignment of *P. obconica* plants. Similar observations, made in both the United States and Europe, provided overwhelming evidence that this plant was the cause of the rash described by Mr. White.

It is now known that the disease results, in most if not in all instances, from direct contact of the skin with the leaves. The first symptoms are reddening of the skin associated with, or followed by, intense itching and the formation of small red papillae. This may be followed by spreading of large serum-filled blisters and some-

time by swelling of the face and eyelids. Finally the outer epidermal layer disintegrates and is eliminated in small fragments. In nearly every particular it closely resembles the rash caused by a number of species of *Rhus*, especially those known as poison ivy or poison oak, although in most cases its attacks cause the victims less suffering.

Specific information as to the cause of the disease has been obtained by the experimental work of a number of European chemists and botanists. Very little of this information seems to have been reported in American publications devoted to either horticulture or medicine, presumably because the journals in which this work was published are available only in the larger libraries. For this reason I am listing at the end of this paper the titles of some of the most important articles, whose contents will be summarized.

The first important contribution to our knowledge of primula poisoning was made in 1900 by A. Nestler, who worked at the Institute for Plant Physiology at Prague (8). He definitely associated the source of the poison with the minute three- to six-celled, gland-tipped, hairs found on both upper and lower leaf surfaces and in greater abundance on the leaf and flower stalks. These hairs, when mature, are easily identified by the yellow or brown contents of the terminal gland. Nestler studied their development and their production of the secretions as shown in Fig. 1, a, b, c. The larger eight- to fourteen-celled hairs (Fig. 2) found especially on the larger veins, scapes, and petioles, are but rarely

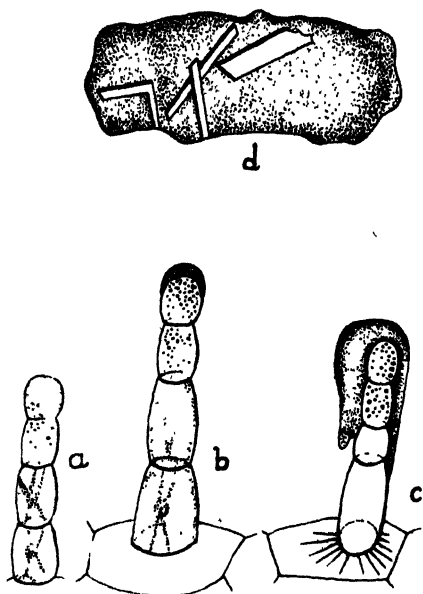


Fig. 1. Gland-bearing hairs of "*Primula obconica*," reproduced from Nestler (8). Young stage (a), all cells showing protoplasmic contents; older stage (b), secretion is beginning to collect outside the gland; secretion (c) now covering the three upper cells; solid secretion (d) in which crystals of primum have separated.

gland tipped. When the lower leaf surface was pressed against a glass slide and the slide, after removal of the leaf, examined with a microscope, Nestler found minute yellowgreen drops or small semi-solid fragments of the secretion. Upon standing, yellow needle-like crystals separated (Fig. 1, d). Both the secretion and the crystals were readily soluble in alcohol, ether, chloroform and strong sulfuric acid but insoluble in water. By rinsing a leaf with ether and allowing the solution to evaporate crystals separated, which closely resembled in color, form, and solubility those which separated directly from the se-

cretion. He next found that a small quantity of the secretion picked up from a slide and transferred to the skin of his lower arm gave, after several hours, a severe inflammation which lasted for eight days. On the other hand, some of the longer hairs, cut from a leaf and bound against his fore arm, gave no rash. In another experiment he applied a strip of the epidermis separated from a petiole to his forearm; this gave a rash after twenty hours, and the diseased skin did not begin to heal until the seventeenth day.

In a later paper (9) Nestler was able to report another important fact. He had noted that some of the crystals, left on a glass slide at room temperature for four days, entirely disap-

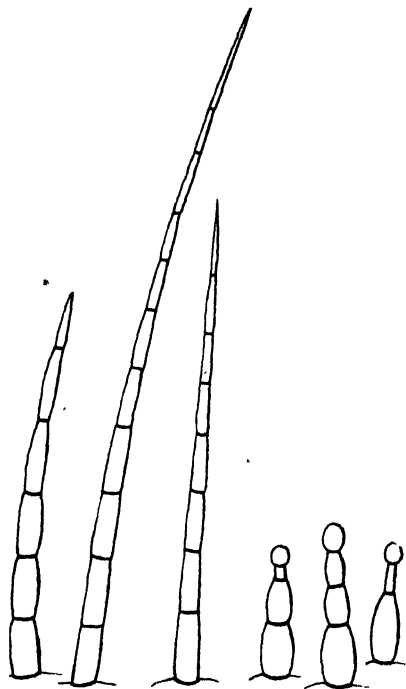


Fig. 2. Long, glandless (left) and short, gland-bearing (right) hairs of "*Primula obconica*."

peared. This led to the discovery that they sublimed from 110° to 115° C and therefore could be purified by this treatment. A minute quantity of the yellow crystals, purified in this manner and transferred to his arm, produced the usual eczema. This marked the final step in his proof that the yellow crystals are the poison, in pure form, to which primula poisoning is due. Discovery of the volatility of the yellow crystals also led Bircher (2) to discover that they could be obtained by direct distillation of the dry plants.

Isolation of the poisonous principle of *P. obconica* made possible the important discoveries of two other scientists, Dr. Bloch and P. Karrer, who worked together at the Botanical Museum of the University of Zurich (3). Karrer did the chemical work. By utilizing the leaves from 2000 plants he was able to prepare 0.1 gm. of the pure yellow rhombic crystals. They were insoluble in water but readily so in organic solvents, melted at 62° - 63° C and gave molecular weights and analyses corresponding to the formula $C_{14}H_{20}O_3$ or $C_{14}H_{18}O_3$. As it was not possible to determine the structural formula with the small amounts available Karrer gave the compound the name "primin". A second batch of plants yielded sufficient primin to enable Bloch to make a lengthy series of experiments on the sensitivity problem. In this work he classified as "normal" those individuals who showed no obvious reaction after a leaf of *P. obconica* had been in contact with the skin, usually the forearm, for twenty-four hours. When, however, the skin of these persons was treated with an ethereal solution, which left a minute quantity of primin distributed over its surface, all showed some reaction. Three out of the eight submitted to the treatment showed

severe eczema, the others only slight reddening of the skin, some itching and formation of minute blisters. A more surprising result was that individuals of the normal class, who had developed some inflammation with pure primin, now showed some reaction when again treated with an obconica leaf. On the other hand, those individuals who responded to the application of the obconica leaf, to whom he applied the term "idiosymkratischer" (sensitive ones) developed a serious rash, which sometimes extended over the wrist and fingers forming large blisters and not healing until the end of three weeks. From one-fiftieth to one one-hundredeth of a milligram was sufficient to give severe infection. The net results of these experiments was the conclusion that all persons are sensitive to some extent subject to primula poisoning but most persons are normal, that is, do not react to the amount of poison communicated to the skin through contact with a single leaf. Expressed in the more modern terminology, most persons are not allergic to primin unless the dosage is sufficiently large. Sensitivity to primin depends upon physiological peculiarities of the individual.

One question not discussed in any of these investigations is the possibility of infection without actual contact with primin. I have met persons who were convinced that a plant of *P. obconica* in a room is capable of causing the rash to appear on sensitive persons present in the room. It is conceivable that, since primin is appreciably volatile, even at room temperature, infection might take place through the vapor of primin, especially if large masses of it were present in the room and the temperature was high. Nevertheless, I find nothing in the reports of those who have worked on

primula poisoning to confirm this suggestion. A similar belief concerning the transmission of the eczema caused by species of *Rhus* has been common in the United States and I have had detailed accounts of experiences which support that belief. On the other hand carefully executed experiments, described by James B. McNair (7), show that this poison is not capable of being transmitted by currents of air. The purest form of the poison obtained by him, to which he gave the name "lobinol", consists of an oily viscous liquid not appreciably volatile at room temperatures. Furthermore, this poison is present in the sap of nearly all tissues of the plant. It accumulates in "resin canals" which penetrate the phloem of the fibrovascular bundles of the roots, stems, leaves, and fruit.

The gradual accumulation of accurate information regarding the poisonous property of *P. obconica* has led to discussions on the advisability of legal restrictions on the sale of the plants. In 1903 a member of the German Reichstag requested the Imperial Health Officer to prepare a report on this subject. The request, so far as I have been able to learn, was not acted upon. In 1931 a similar agitation was initiated in Holland by a prominent dermatologist, which gave rise to much public discussion but the gardeners and florists were able to convince the public that the sufferings caused by this plant were too small to justify eliminating a source of so much enjoyment to householders of all classes. No other plant of such outstanding beauty, rapidity of growth, and adaptability to the living rooms of the average citizen was available.

The final decision as to whether there is justification for such legislation must be based on a variety of considerations. Perhaps the most important

of all concerns the percentage of normal as compared with sensitive persons, and on this subject we have little specific information. The matter was discussed at a meeting of the Prussian Gardeners Association held in Berlin in 1902. A number of unusually severe cases of poisoning had been reported, but it was suggested that some of these were accompanied by rashes caused by other diseases. One member expressed the belief that thirty percent were sensitive but one, "Garteninspector Perling", estimated only five percent were sensitive and opposed police regulation. It is stated that in 1907 Ulbrich and Eitel estimated the sensitive persons at six percent but I have not had access to their publication. In dealing with this matter it should be noted that most of the cases of primula poisoning reported relate to individuals employed in establishments in which they are obliged to come in contact with many plants, and the percentage of such persons who acquire the rash is clearly greater than that of those who, though near the plants are not obliged to handle the foliage.

Although public opinion has had little interest in, or has not been willing to restrict, the sale of *P. obconica* there is much merit in an attempt to avoid whatever suffering is caused by it. To this end efforts have been made, especially in Germany, to discover or develop races of the obconica which lack the poisonous property, or to develop hybrids between it and non-poisonous species which might be non-poisonous. Experiments directed toward these objectives were undertaken at the Institute of Plant Culture at the University of Berlin in 1929 by Maurer and Storck (6). Their first task was to ascertain what variations existed in the primum content of the varieties then in cultivation. Their

attempt to achieve this end by counting the number of poison-producing hairs per unit area of tissue surface derived from corresponding organs of the different varieties proved tedious and failed to yield convincing evidence that such differences were constant. Further, it is evident that this method does not necessarily fix the yield of primin per unit area unless it is assumed that all the hairs produce the same amount of primin. The quantitative separation of primin from plant tissue, even by use of methods based on its volatility, is both inaccurate and extremely time-consuming. Maurer and Storck were able however to develop a procedure based on a qualitative test for primin discovered by Nestler (10). The latter found that treatment of a very dilute solution of primin in ether with concentrated sulfuric acid gave a series of color changes, from yellow, to green, to blue, and that the intensity of the blue finally attained was proportional to the amount of primin present. By using leaves of approximately the same surface area and also exactly the same quantities of reagents, and by allowing the mixtures to stand for the same time intervals, they were able to estimate the relative amounts of primin produced by different leaves. By this test they established the fact that different leaves from the same plant gave the same color intensity and also that leaves from different plants of the same variety, grown under identical conditions, gave similar color intensities. When this procedure was applied to plants of twenty-seven different varieties, all grown in the same greenhouse during the same time interval, it was found possible to classify these varieties into six categories. Study of this classification shows that varieties of the *grandiflora* type. (Fig. 30, which were introduced in 1894, ap-

peared most frequently in the low rather than the high primin content classes. Those of the gigantic class, introduced in 1906, were with one exception in the high or very high primin class. None of the varieties examined was entirely free from primin.

The gigantea varieties are distinguished by greater vigor of foliage, sturdiness of flower scapes, size and intensity of flower color. The German horticulturalists believe they all came from a hybrid between *P. obconica* and *P. megaseacfolia*, a rare species from the Caucasus Mountains. The detailed account of how this hybrid was obtained by Herr Arends, a plant breeder of Ronsdorf, Germany, seems convincing, and such hybrids are known in Germany as *P. Arendsii*. On the other hand, English and French horticulturalists believe (1) that the gigantea varieties arose through mutation of *P. obconica* alone. They base their brief on the facts that varieties of this class appeared in English and French greenhouses where there were no plants of *P. megaseacfolia*; that they show none of the distinctive botanical features of that species; and that attempts to produce hybrids between these species have failed. Since *P. megaseacfolia* does not produce primin the greater primin-content of the supposed hybrids somewhat discredits the hybrid theory. Finally, cytological studies of the gigantea varieties do not disclose any evidence of a hybrid origin.

Although the results of Maurer and Storck show decided and constant variations in the primin content of all the obconica varieties they also suggest that the more highly bred varieties produce more primin. This does not lend encouragement to the hope that plants of high ornamental value combined with a low primin content can be produced.

The creation of a poison-free obconica hybrid may prove to be a difficult undertaking. Although only two of the 450 known species and subspecies produce primin the formation of hybrids between these species is, so far as we have accurate information, limited to combinations of species belonging to the same section of the genus. Further, membership of a pair of species in the same section is no guarantee that they can be made to form hybrids. The Obconica Section includes nine species and an equal number of subspecies, most of which have never been cultivated. In 1913 Professor Bailey Balfour suggested (1) that *P. sinolisteri*, which he classed as a subspecies of *P. obconica*, might be developed into a satisfactory substitute for the obconica. This is an annual species (Fig. 4) from the Tali Plateau of Yunnan, China, known to be easily grown and, since its foliage is nearly glabrous, probably not a producer of primin. This suggestion was not acted on but George Ahrends conceived and acted on the idea of hybridizing the cultivated varieties of *P. obconica* with it. After one hundred cross pollinations he succeeded in 1933 (6) in harvesting a single capsule from a plant of *P. sinolisteri* pollinated with a *grandiflora* obconica, which capsule gave a single hybrid plant. This was back crossed with *P. sinolisteri* and a number of second generation hybrids obtained, all of which showed features suggestive of both the parent species. Six of them were sent to Maurer and Storck who tested their poison-producing properties by applying their leaves to the arms of persons previously found to be sensitive to obconica poisoning. Two of the six gave strong reactions, two others weak reactions, and two no reactions.

The leaves of *P. sinilisteri* produced no rash nor did they give the color test

for primin with sulfuric acid. Although even the best of these hybrids were decidedly inferior in sturdiness of foliage and scapes and in abundance, size, and beauty of their flowers, they might be classed as reasonably successful stages which might culminate in a poison-free primula of the obconica type. Further reports on the progress of Ahrend's work have not, so far as I know, been made public.

A third suggestion for dealing with the problem of primula poisoning was to improve the ornamental features of *P. malacoides* to such a degree that the public would accept it, at least in part, as a substitute for the obconica. Many cases of poisoning were attributed to this and other species of primula by correspondents of the Gardener's Chronicle (London) for the year 1914. Since that date tests with persons sensitive to obconica poisoning failed to show any reaction from the leaves of *P. malacoides*, and the sulfuric acid test does not show any evidence of the breeding programs were begun in Germany and Switzerland (5) for the purpose of improving this species and notable progress has been made. Some of the newer varieties make remarkably fine pot plants but the extent to which the public will be willing to substitute them for the obconica has yet to be determined.

Still other species of primula have been reported to be the cause of eczema. Most of these reports have been based on meager or doubtful evidence. At present only two species, in addition to *P. obconica*, have been positively shown to be poisonous. Nestler (8) found that the leaves of *P. sinensis* bear a few gland-tipped hairs, from which he was able to isolate a small amount of a greenish yellow secretion as well as yellow crystals having the characteristic form of primin crystals. He also experienced a slight eczema



Fig. 3. A white-flowered plant of the grandiflora type of the obconica; Height eight inches, Berkeley, Calif., March 5, 1939

after handling the leaves. This species is one of the most beautiful of greenhouse plants but it is rarely sold by florists at present. Several correspondents of the *Gardeners Chronicle* (London) have reported it to be the cause of poisoning.

In his paper of 1908 Nestler (10) reported *P. mollis* to be a third poisonous species. This is a native of the Himalayas which has attractive cineraria-like leaves and weak, free-flowered scapes. Although it has been in cultivation as a greenhouse plant for many years it has never been popular.

Nestler obtained ample evidence of its poisonous properties by experiments upon himself. He found its action fully as severe as that of the obconica and that its poison came from gland-tipped hairs. He was unable to separate this poison in pure form but showed clearly that it differed from primin in some of its essential properties.

There is nothing to indicate that the people of the United States have ever seriously concerned themselves with the subject of primula poisoning. Many of the hospitals of California and some of those of Oregon and Washington

refuse to permit plants of the obconica to be taken into the rooms of their patients but I know of no proposals to legislate against its sale here or in England. The sensitivity of different individuals is a physiological peculiarity, presumably associated with racial characteristics such as the texture of the skin, the color of the eyes, hair, or skin. The many races represented in the population of this country might give rise to wide variations in the sensitivity proportion in the different regions of our wide domain. I am inclined to believe from such information as I have been able to acquire, that this proportion is less for this locality than in the areas of Germany for which we have some data. Consultations which I have had with many physicians in this neighborhood make it clear that the number of cases brought to their attention is extremely small; frequently only a single case could be cited during the course of several years of active practice. It is probable that many cases were of so mild a nature as to pass unnoticed or to be disregarded, as is the common practice with the more frequent cases of Rhus poisoning. Conversations with managers of greenhouses, in which obconicas were grown in large numbers, brought information of importance. In one establishment I was told that four out of eight employees, working with obconicas, suffered from the rash. At least four other establishments considered the four-to-eight ratio of sensitive persons entirely too high. There was complete agreement in the belief that the rash caused much less discomfort than that of poison oak, and in no instance were the afflicted workmen obliged to give up their accustomed duties.

Another question related to that considered in the preceding paragraph is whether the obconicas grown in this country are as virulent as those grown



Fig. 4. A young plant of "*Primula sinolisteri*": height four inches, Berkeley, Calif., May 28, 1928.

and tested in Germany. Since nearly all the modern named varieties grown here originated in Germany or England and since most of the seed used here, up to the time of World War II, came from these countries the same differences in the primin contents of the varieties grown here as those used by Maurer and Storck might be anticipated, unless differences in the conditions under which the plants are grown here are sufficient to materially affect their primin production. At present, however, most of our florists are bliged to raise their own seed or to depend upon seed grown by inexperienced plant breeders. This has made it impossible for me to obtain either plants or seed of standard named varieties. I have made tests on single leaves of many specimens secured from a number of commercial greenhouses and on some grown by myself. In only a few instances was it possible to associate these specimens with standard named varieties and it was not always

possible to decide whether a specimen belonged to the grandiflora or the gigantea class. In general however the conclusions of Maurer and Storck were confirmed. Plants of the more diffused habit of growth, with smaller flowers, especially the white-flowered specimens, showed less primin than the more compact, larger flowered, especially those with the deep red flowers, of the gigantea class. Plants of the Wyaston Wonder variety, of which I was able to obtain authentic seed, showed a rather large primin content. Plants of the double pink variety called Portland Beauty, an American variety of the grandiflora class, showed a low primin content. It should be noted that these statements concern only the relative amounts of primin in the particular series of plants whose leaves were tested. These tests give no specific information regarding the amounts found in these plants as compared with those found in the German-grown plants tested by Bloch.

There is need of accurate information as to the sensitivity of our population to the obconica plants which appear in our florists shops. To acquire such information would necessitate experiments on a large number of individuals, similar to those made by Bloch and Karrer, as well as estimations of the primin contents of the varieties commonly sold. These experiments would require the facilities of a bio-

chemical laboratory as well as a greenhouse in which large numbers of plants could be grown under constant conditions. It is a project worthy of the attention of some agency of the Federal government or of some of our Agricultural Experiment Stations.

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The Herb Society of America

MARTHA GENUNG STEARNS

In August of this year, the Herb Society of America will celebrate the 13th anniversary of the day when a group of seven women, under the chairmanship of Mrs. Albert C. Burrage, Jr., met in Boston and formulated a plan for these purposes: "To further the knowledge of herbs, and to contribute to the records of horticulture and science the results of the experience and research of its members." The Society was incorporated May 14, 1935, and adopted as its seal a design by Mrs. Florence Bratenahl of sprays of thyme, after a woodcut in Gerard's Herbal, with a phrase from another herbalist, John Parkinson, "For Use and For Delight."

Much of the great volume of the world's knowledge about useful plants had been forgotten by the public, and herbs had sunk to the level of a hobby among a few growers of "old-time gardens." Consequently one of the most intensely practical and rewarding branches of horticulture was being neglected, and its tremendous potentialities for pleasure and profit being missed.

Dr. Edgar Anderson, our first President-at-large, once made the statement that "a large bulk of our botanical knowledge was not accumulated by scientists but that enthusiastic amateurs had contributed enormously to the growth of knowledge." The members of the H.S.A., therefore, went quietly to work in their gardens and their libraries, and in these years they have contributed a goodly volume of information to the subject of herbs, in its three main classifications of medicinal, aromatic and flavor-plants.

The Society has never had a drive for membership, nor been interested in mere numbers, and has refused to allow itself to be used by those whose interest is mainly what we may call sentimental. The first group was slowly enlarged, by invitation, to include those seriously interested in the horticultural, botanical or utilitarian phases of herb growing. In its By-Laws the eligibility of a member is gauged by results shown in work or research, or creditable achievements in the growing and use of herbs. Among these are a surprising variety of activities, as many people may each have a different approach to the subject. It may be a literary approach, the study of old herbals, the making of bibliographies or compilations, or practical, like experiments with perfumes, cordials, dye-plants; or it may be the fundamental job of raising herbs out of the soil, developing new strains, collecting varieties, or comparing notes with other growers, for a great correspondence is growing up between compatible people on their common interests. The Society as such does not engage in commerce, although it is definitely interested in the possibilities of private and commercial herb growing as a national resource.

The original group is now called the New England Unit in a nation-wide membership; to it have now been added six other Units: those of Philadelphia, New York, St. Louis, Western Reserve, California and Oregon. There is also a large number of scattered individual members. The reports from these Units show activity and growth even through the war years; in fact the war has brought out many uses for

herbs, in substituting our native flavor-plants and condiments for some of the foreign imports, and in discovering a new pleasure in their fragrance and quiet beauty and their easiness to grow.

A brief survey of our records indicates something of the many-sided fascination of these plants, often so modest and sober-hued, often growing along our roadsides, but with so much to contribute.

The first appearance of *The Herbarist*, our annual publication, was in 1935. That year's edition, being rather small, is now out of print and has become a collector's item. Many well known names are on the list of contributors, with a wide range of subjects, and the circulation goes on, with a continued and growing demand from all over the United States and Canada, as well as England, France, Australia and New Zealand. It makes its 12th appearance this year, and the first ten numbers have been carefully indexed.

In 1937 the infant Society already had several achievements to its credit. One was a substantial gift toward the publication of the Aztec Herbal, better known perhaps as the *Badianus* manuscript, which was discovered among the great collections of the Vatican Library by Dr. Charles Upson Clark and translated by Dr. Emily W. Ensmart, a member of the Society. At the Massachusetts Horticultural Society's spring flower show in 1936, the H.S.A. exhibited an "Old-world Bee Garden," which was rated 100% and awarded a gold medal. In January, 1937, the Society launched a three-year project for the study of some culinary and aromatic herbs grown under different soil and climate conditions, to determine the varieties and methods yielding maximum quality and quantity. That there might be a uniform basis of comparison, plots of 100 square feet were used and data kept on soil, fertilizer,

source of seed, harvesting and drying, and the findings of these tests are among the Society's printed publications.

A large Bibliography made by a member and since kept up to date is to be found in the Library of the Massachusetts Horticultural Society in Boston, with a cross index giving author, title and subject for ready use by writers, students and researchers. This includes not only books directly about herbs, herbals, horticultural expeditions, native remedies, and so on, but it gives many references to literature, magazine, articles, even cookbooks.

Also available to the public at Horticultural Hall is the Society's Herbarium of dried specimens, arranged in the botanical order given in Bailey's manual of Cultivated Plants and Gray's New Manual of Botany. It has now reached the sizable dimensions of 2,399 sheets and more than 1,286 species, and is often visited by botany and nature classes. Its curator has arranged exhibits from time to time in glass cases which attract much favorable attention; for example, a demonstration of ragweed for school children who volunteered to help eradicate this undesirable plant. The Herbarium, like the Bibliography, is a project which can never be considered as completed. The curator reports correspondence with 28 Colleges of Pharmacy, 46 Gardens, numerous herbaria, botanical gardens and parks, with exchanges of lists and photographs.

A large collection of books with a special bookplate in memory of one of the Society's founders, Mrs. Charles L. Norton, is constantly growing, and the Society is collecting slides which it hopes to incorporate into its educational program with accompanying lectures.

One more New England project has been the Harvard Herb Garden planted

and landscaped on the site of the Gray Herbarium in Cambridge, which was offered to the Society by Dr. E. D. Merrill, head of the Botany Department of Harvard University. The labor shortage during the war had a discouraging effect on this garden, but it was for some years a green and fragrant place much enjoyed by residents in its neighborhood. The Society as a whole has been active in similar plantings, notably the Philadelphia Unit, which developed a fine medicinal herb garden at the College of Physicians there, as a memorial to Dr. Wharton Sinkler, with wonderful educational possibilities and beauty. The Western Reserve Unit started an herb garden as a part of the Cleveland park system; one of our members designed and gave the herb garden at the Cloisters, New York City; another, Mrs. Bratenahl, designed the exquisite little Cathedral garden in Washington, D. C., and later created a beautiful place out of a wild tract in Bethesda, Maryland, The Weathered Oak Herb Farm. Two other members were consultants in the reconstruction of the kitchen garden at Mount Vernon. The New York Unit has collaborated with the New York Botanical Garden in several herbal projects, and this Unit also has an herb bibliography.

News-Letters are circulated as a means of keeping the far-flung Units and members in touch. About 500 letters of inquiry are received in the course of a year, from remote corners of the globe and from small towns in America, and it has been necessary to send out printed information sheets on the sources of herb seeds and plants, reading lists and other data.

By 1940, the war was changing the aspect of the world and affecting the steadiness of the herb trade. The commercial product has for many years been imported from Europe because of

the cheapness of labor there; but with the devastation and impoverishment of the soil now, as well as the cessation of labor other than for war purposes, America may find herself able to recapture the herb trade tossed back to her. We have seen wars before, when drug plants were urgently needed, condiments ran short, substitutes for tea and oils were searched for. *The Herbarist* published war-time numbers in 1940, '41 and '42, rallying our members to work out and report on certain problems. The Society has also made reports on seed strains, fertilizer tests and growing conditions, and is glad to make its results available to the public. Many of our members have sent quantities of seed abroad, notably the Oregon Unit, who responded to a request from England.

We cannot close without referring to a few more individual projects which have established valuable results. Thanks to one of our members, who brought a little plant of the true Cretan Dittany home in her pocket-book, many people can now recognize and own this survival from the classical past, unknown before in this hemisphere. It was carefully nurtured, seeds and cuttings secured, and its distribution across the country has been due to the efforts of our Society. A member in Australia has sent generous packets of seed in letters and thereby introduced new varieties to American gardens. A member is collecting old prints and plates for a "pictorial history" of herbs of past centuries, which will be priceless some day. Another made successful experiments in vegetable dyeing from our native plants and worked out a wide range of shades; her lichen dyes especially stood drastic tests for permanency. Still another has specialized in Indian medicinal plants, and another has done quite sensational things in dehydrating plants so as to

preserve them in three dimensions instead of pressed flat.

Many of us have worked out acceptable recipes and by becoming adept in herbal flavoring and seasoning have done something toward relieving the dullness of war-time cookery. We shall be content if, in the years to come, our researches result in the acquainting of American cooks with the subtle and interesting effects of our own native

seasonings, and the adding of herb uses to the food habits of America. As one of the Society's members said in the early days, "Herbs in a way have the same relationship to plants that folk-songs have to music. They possess a naive homely charm which smacks of the soil, and their study ramifies into all kinds of interesting by-paths in the arts, customs and history of the different nations."

Gardening in Shade

LOUISE IHLDER

In every community there are gardens where shade of one sort or another is the element that determines all the development possible. Such a problem came up for consideration and study in the Georgetown Garden Club of Washington, D. C., and the Horticultural Committee* decided that it would make a formal report to the club.

Shade itself is something that has to be considered since there are various degrees of shadiness and various causes for shade. The most solid shade is that which is cast by buildings and if the buildings are tall enough and large enough, even the passage of the sun in summer may not allow even an hour or two of sunlight to all on the earth. Shade from trees, on the other hand, may be dense as that which comes from maples for example or broken like that of locust trees; but in either case, the shadow cast by the tree moves during the hours of the day and the earth and the plants growing there may

have some hours of sunlight. Shade from trees causes definite reactions which may be further complicated by the factor of the root competition of the trees resulting in a particularly difficult combination.

The Georgetown Garden Club works in many city gardens, where in addition to the factors mentioned there is the further difficulty of poor air movement, due to the houses themselves and in many cases to the free use of garden walls, which not only cast shadows but which impede air movement.

Recognizing these factors, the club has brought together the following suggestions from their practical experience.

The Committee wishes to point out that there are some spots in which it is useless to attempt to grow plants, such spots as those at the base of north walls, airless corners shaded by house or wall or trees where no sun ever reaches. These should be given a different treatment, paving them with flagstones, brick or even gravel and designing an area large enough for use, with chairs or benches for sitting, a shelter open as in a pergola or a garden

*The Horticultural Committee: Mrs. Charles Bittinger, Chairman, Mrs. J. Hanson Boyden, Mrs. H. H. Donnally, Miss Katharine A. Dougall, Miss Nan Hollerith, Mrs. John Ihlder, Mrs. B. H. Meyer, Mrs. Frank A. West, Mrs. R. F. Whitehead.

building for tools or other work purposes, useful in the smallest garden.

Some of the members have been very clever in treating their shade problems. One of the newest members in treating her square back yard, made a large circle in the center, covered it with gravel and treated the balance of the yard, kept at a level of a wall two bricks higher than the gravel area, with a mass of shrubs and plants that are shade tolerant. As there are two large trees in the garden it is truly shady but it has been made into a beautiful place.

Potted plants are useful in shaded gardens and vines planted where the roots have sun can be trained into the area where it is shady. A wall fountain or a wall bird bath, a small pool for reflections, a shelf for potted plants, or a built-in bench can be made the feature of such a shady place. You may even build a simple fireplace for burning all garden litter that cannot be transmuted into humus! But don't abandon humus making for a place can be found for it, behind shrubs or behind some built in feature. And don't forget that the fireplace can be elaborated into the popular "barbecue" if you still yearn to cook!

Another useful device in planning the shaded area, is to give up the idea of a border at the foot of a wall, and put the path next to the wall and the border out into the sun. A difference of only 3 or 4 feet is often enough to make a success of the border since there it will have both sun and air, the air often being the more important.

There are suggestions for spots that hardly ever get sun, there are those places under shrubs or trees (high shade) which get sun in the spring but none once the trees are fully leafed out. Here early flowering bulbs like winter aconite, snow drops, scillas (*sibirica* and *campanulata*), leucojums, erythroniums and species crocus do well; and if the

ground be interplanted with ferns, these will hide the space and the dying leaves of the bulbs. They serve also to cover the areas devoted to many wild flowers most of which disappear after blooming. Personally I believe that ferns are not used nearly enough. The common ones, lady fern, cinnamon, Christmas do well almost anywhere. Nursery catalogues that specialize in native plants will tell you what to do, what to plant and where.

The success of all these schemes will depend on good soil, good soil preparation and good drainage; loam, sand and plenty of humus. In fact the committee feels that where soil is properly prepared many plants will grow in what appear to be inauspicious places if soil and drainage are right but one cannot expect any plant to grow in soil as hard as iron or filled with builder's rubble.

Another difficulty results from the combination of shade and root competition already mentioned. Sometimes it is possible to encircle a big tree with a well designed bench, with gravel or paving before it, thus reducing the area to be treated.

Since grass is always difficult in this climate, if your space is difficult, give it up. Use some other surface, decorating it with beds and borders where feasible, potted plants otherwise, furniture, small architectural details; look upon the area as a room and treat it as such. You may prefer and long for a panel of perfect turf, but there is a comparable beauty in the pattern of paving, brick or stone, however simple. This to me is the answer to the difficulty of the small enclosed garden. You cannot have "masses of bloom" but you can have order and intimate beauty and peace.

The Committee has compiled lists of plants that are shade tolerant varying in size from ground covers to small trees which it hopes will be useful. It

is not considered a complete list of all data which can be compiled by any one from the literature followed by a period of trial and error. Whatever else is forgotten remember that every growing thing needs some sun and air, and if not sun an abundance of light.

Ground Covers

Pachysandra is recommended in all books but is considered as particularly uninspiring by the Committee. Needs a fair degree of moisture. *Ivy*: use the small leaved forms for ground cover, reserving the larger leaved forms for climbing!

Periwinkle, *Vinca minor*, grows well in shade but blooms sparingly. Bowles' variety blooms more or less all season. In muggy weather myrtle is attacked by a fungus which must be controlled by any good fungicide sprayed regularly.

Wild Ginger. This will really cover the ground but gets shabby in summer unless watered. The evergreen species with variegated (marbled) leaves is best for year round effect

Bugle, *Ajuga reptans* in blue, white and pink flowered forms grows in shade but needs sun to flower well. In shade it does not overrun everything.

Annuals

The committee is inclined to pass this by, especially the book lists but tobacco, torenia and browallia all bloom in shade and forget-me-nots and impatiens treated as annual will also perform.

Perennials

From the several lists presented and studied, the following are chosen:

Begonia evansiana, hardy begonia is excellent here and planted with ferns makes an excellent combination. Late flowering. Also late appearing in Spring, so don't dig up.

Funkias or *plantain lilies*. There are many of these, with differences in leaf size and color, size and color as well as season of bloom. One of the few plants that seem actually able to compete with tree roots.

Anemones, *Japanese* and *Chinese* and *platycodons* make excellent combinations and can be reinforced with bleeding heart or Dutchman's breeches. Then there are all the other things that might go here, many of some fewer of others: foxgloves, snake root (*Cimicifuga*) violets, mertensia, *Phlox divaricata*, pulmonarias, epimediums, sweet rockets, eupatoriums both blue and white, meadow rues, the Missouri evening primrose, snakesbeard (*Ophiopogon*) and its smaller allies, and all the new varieties of our native *Tradescantia*.

Lily-of-the-valley needs a paragraph apart, and it also needs a good fertilizing in late summer when the flower buds are forming not forgetting and occasional thinning when the root competition gets too strong!

Heimerocallis appear in many lists but do not flower well here, save the old faithful *fulva* and its double form.

Strawberry begonia or *geranium* which is none of these things but *Saxifraga sarmentosa* will grow in sun or shade or "betwixt and between." Nice in low rock walls where its "cute" little rosettes form at the end of the wiry runner.

Arum italicum is one of the handsomest leaves in the garden with beautiful, if fleeting, great pale green spathes in early spring. The fruits are brilliant scarlet, like those of Jack-in-the-pulpit. There is a lesser growth of leaves in the autumn.

Heuchera, *anchusa* and *polemonium* are a good trio but they need half sun and moisture.

Lilies. These prefer partial shade: *L. auratum* (Gold banded), *Hansonii*

(Hanson's lily), *Henryi* (Henry's lily), *japonicum* (Kramer's lovely pink). The Eastern *philadelphicum*, *Grayi*, *superbum*, and *canadense* also fare well. And don't forget to prepare the soil well with plenty of humus and good drainage, etc. Look up details for lily planting and do a good job.

Galax and *Shortia*. A local horticulturist says that they do extremely well in half shade, even in deep shade under oaks. His *galax* proves it, but the *shortia* is never in stock long enough to be certain. In neither case allow them to go bone dry in summer.

Tuberous Begonias if your garden will stand the opulence of their flowers when well grown, but whatever else don't plant them where the light is limited, and the moisture should be constant in whatever degree of wetness you attempt.

Shrubs

The list here is longer and more varied and the knowing gardener can choose as he or she may wish, with emphasis on evergreen or deciduous species or with emphasis on flower and fruit or on mere greenness.

Rhododendron, azalea, laurel (*Kalmia*), huckleberries, leucothoe, *Nandina* (strictly a town shrub in this climate), *Viburnum* *Carlesi*, *Burkwoodii* for evergreens, *dentatum* and *lantana* for deciduous. All *viburnum*s are slow to come into good blooming in these conditions of shade. *Hydrangea arborescens* and *H. quercifolia*. Naked jasmine and Japanese maples, *suffruticosa* box, *Pyracantha*s which will grow but not flower and fruit in shade, *cochorus* or *Kerria*, various privets, figs, which are most decorative and will fruit with a little warm sun, *rhodotypos*, the holly like *osmanthus* which will tolerate dense shade, bayberry, mahonias which need sun to fruit however, *Chimonanthus praecox* or wintersweet, hardy

orange (*Poncirus trifoliata*) which is an excellent town shrub but does not fruit without some sun, pomegranates, which flower well enough in protected even if shady places, and the slow growing Hungarian laurel (*Pseudocercasus*).

Trees

Here again we have a considerable list which will have to be studied in accordance with the size they reach and the problem which may result from the shade they will add to the already shaded garden.

Shadblow (*Amelanchier*), Judas tree (*Cercis*), Dogwood, Spicebush (*Lindera*), all magnolias but perhaps the native *Magnolia virginiana*, witch hazel, all hollies, both small and large, *Ilex crenata* and its forms, *glabra* if you like it, *cornuta* which is slow growing; fringe tree, *Halesia* if there is room, and the larger Japanese maples.

Conifers

Nearly all the yews will do well, and depending on the site, our hemlocks which may suffer from red spider if the place is too confined and hot.

Vines

Euonymus will grow anywhere, but one has to maintain a constant guard against scale insects. Clematis, in three species grow and flower sparingly; *virginiana*, *montana*, *paniculata*. All *ampelopsis* and their kin grow well and are dearly beloved by the Japanese beetle. Wisteria will tolerate roots in shade but its tops must reach the sun to flower, and in small gardens needs ruthless pruning to keep it in bounds. Another shrub that will respond well to wall treatment is the forsythia particularly in its species *suspensa* which comes closer to being a vine in habit and will flower moderately well in some shade. Naked jasmine has already been mentioned. Even a few of the

climbing roses like Mermaid, Mary Wallace and their ilk will yield a few flowers in the shady garden.

As a parting thought, it is wise to remember there frequently is a new

beauty in the more delicate growth that shade induces. The plant appears to reach up and spread out, instead of becoming dense, bushy, robustious, all of which gives a new attractiveness.

Water Gardens

ALFRED J. PROEBSTLE

One of the most amazing things about water gardening is that so many persons deprive themselves of the pleasure to be afforded by the garden pool. Here in Brazoria, Texas, which is in Zone 7, it is probably the simplest and certainly the most satisfying form of gardening.

To begin with the construction of the pool I find that we need a little more depth of water over the crown of the plants, due to our long summers, and recommend that there be allowed twenty to twenty-four inches, depending on the degree of shade over the pool, and incidentally I have found that a high shade, such as that afforded by pecan trees, is no detriment to the production of fine flowers. As we have no frost to speak of, the pool can be constructed with a minimum of steel, although some is necessary to take care of the contraction of the ground during a prolonged drouth. The size and shape of the pool depend entirely upon the surroundings but once that has been decided upon the fun begins, and it is my firm conviction that no garden is too small for some sort of pool. Even tub gardens give a reward far beyond ordinary expectations. I might mention that baleful eyed health inspectors sometimes descend upon one in cities shouting that pools breed mosquitoes, but that is simply not so when there are fish in the pool. Fish eat mosquito larvae at once, and when there are no

wiggle-tails in the pool there will be no mosquitoes.

Water gardeners have a tendency to overcrowd their pools so to curb that inclination in one of my pools I excavated places for stationary containers, but it didn't work, for I found myself putting plants in tubs between the stationary urns. However this form of construction had one advantage, it saved quite a lot of digging, in as much as I did not have to excavate the entire pool to the depth of the bottom of the pots, each of which is two feet in diameter. In mixing soil for the pots I use a good garden soil with well rotted cow manure and about a quart of bone meal to the bushel of soil. Be sure the bone meal is ground, not cut with acid, the kind used for stock food being acceptable, even if a little more expensive than plain bonemeal.

Having built the pool and filled the containers one has the difficult task of choosing plants to fill them, difficult only because there is such a wealth of material that it is hard to confine one's self to a given number of plants. Thanks to Mr. George H. Pring, of Missouri Botanical Garden, there are colors to suit every taste, and if one finds it impossible to stick to one color, there are even by-colors. Mr. Pring's work in hybridizing tropical lilies has put all water gardeners in debt to him. I have found that tropical lilies give so much more in the way of flowers that



Robert Taylor

Yellow Star



Robert Taylor

Persian Lilac

I have given up growing hardy lilies long since.

In order to retain the maximum bloom throughout the summer it is well to feel the plant from time to time during the growing season. I find bonemeal thoroughly soaked in water applied to the surface of the containers to be a good slow, long-lasting fertilizer. For a quicker feeding a tablespoon of bloodmeal wrapped in tissue paper and thrust into each tub will produce miracles. This should be repeated every week to ten days.

Tropical lilies are to be had in day or night blooming varieties, and the day blooming lilies come in viviparous (bearing small plants on the leaves) or non-viviparous varieties. The day blooming varieties come in all colors but red, although there are some very deep rose shades which will do nicely until a good red is produced. The night bloomers are in various shades of red, and white.

The viviparous varieties are completely fascinating because of their habit of reproduction, the plantlets occasionally setting tiny flower buds before becoming detached from the parent plant. In these Bagdad has become a favorite, with its pale wisteria blue flowers and magnificent bronze leaves. Peach Blow is a lovely clear pink at the tips of the petals, shading to yellow below, one of the new bi-colors, Talisman being the other, amply described by its name. Wild Rose has also done well in our pools. Sunbeam is a good clear yellow.

In the newer non-viviparous varieties I have found Midnight to be an exceptionally fine blue, and Director George T. Moore is the answer to prayer for the small pool, as it produces worlds of rich purple flowers, smaller than the older types, to be sure, but so many more of them. Persian Lilac has done well here, with its pink-lilac flowers

and light green leaves. In yellow, African Gold is much more vivid than St. Louis (the first of the yellows to be produced) even if it is a little less dependable, and Yellow Star is a good variety. It would be rank ingratitude to fail to mention that old favorite, General Pershing, in the list of non-viviparous lilies that have given me pleasure, for year in and year out you can depend on the General with the beautiful pink flowers that become more beautiful with their deepening of color as the cool nights of fall come on. I find that most of the lilies become more beautiful in the fall, and frequently they bloom all the year round.

I have found only one lily to be temperamental as to the water in the pool. That is Victoria Regia, and it flatly refuses to grow in the well water we have here. I have a special pool for it, which I keep filled with rain water, and that solves the question. This year Victoria has bloomed from June 17th through November, but that is because we have had no frost during that time. The first frost usually kills this plant, which we treat as an annual. This is the only plant that does not winter outside here, however it produces many seeds and I have not had to buy new stock since my first crop of seeds, some ten years ago. Victoria is a night flowering lily, opening pure white on the first night, and pale pink the second. Each flower blooms only twice, but the flowers are produced in rapid succession so that there are few nights without flowers. Even if it did nothing but produce the magnificent leaves with their turned up edges it would be worth whatever it takes to have it. The fragrance is indescribable, some say it is like crushed pineapple, preceding the actual opening of the flower by several hours, so that those who know and love it are fre-

quently heard to exclaim "Vicky is going to bloom tonight."

For the rank amateur the Zanzibar lilies are still good ones with which to experiment. They come in all shades of blue from the pale washed out shades to a royal purple, and in similar shades of rose. Their only drawback is that the seedlings get to be a problem, for they are very prolific, and here we sometimes have three generations of plants in a summer.

The night flowering lilies are the flowers for the person who works day-times, opening as they do after dusk and remaining open until mid-morning.

Missouri is, to my mind, the finest white; with its beautiful fluted-margined leaves. For a red lily I suspect Frank Trelease is the old reliable, but there are others such as H. C. Haarstick, Mrs. Geo. C. Hitchcock, Sturtevant, etc., which add greatly to the beauty of the pool. I find that it takes a little more heat to bring the night blooming varieties into flower, so that they are usually a couple of weeks later than the day blooming lilies.

Someone has said that a landscape without water is monotonous, to which I add that a pool without lilies is sacrilege.

A Key to the Cultivated Hostas

EDGAR T. WHERRY

The Plaintain-lilies, widely known to horticulturists as Funkias, are now classed by botanists as members of the genus *Hosta*. About ten species are believed to be in cultivation, but the nomenclature of these and their variants is in a rather confused state. Some species are distributed under several different names, while certain horticultural-variety names may get applied to variants of almost any species. Repeated requests for identification of garden material have led the writer to look into the literature on the group. The chief modern taxonomic studies are those by Bailey (*Gentes Herbarum* 2:119, 1930 and 2:433, 1932) and by Stearn (*Gardener's Chronicle* 90: 27, 47, 88, and 110, 1931). The keys presented by these authors being somewhat unsatisfactory, a new one has been prepared; and this has proved sufficiently helpful in identifying cul-

tivated plants to make its publication seem worth while.

One species, *Hosta plantaginica*, is so different from all the rest as to constitute a distinct section, *Niobe*. The remainder of the genus was divided by Bailey (op. cit., p. 121) into two sections on the basis of differences in corolla-shape. Since, however, there is complete transition from sudden to gradual expansion of the corolla-tube, this plan is not accepted here.

The accompanying key provides for 10 presumable species believed to be in cultivation. In it, after the accepted name of each, there are given the more important or frequently used synonyms. Then come the horticultural varieties ("h.v.") definitely assignable to one or another species; many names used in the trade could not be included because their application is indefinite. The original representative of each

species, customarily termed "the type" in horticultural writings, is here for uniformity designated "h.v. *typica*."

Since *Hostas* vary in stature, leaf-size, etc., in response to cultural conditions, it is to be understood that the data given in the key represent average or "normal" values. There is also variation in blooming period from place to place; the dates given correspond to normal growing seasons at latitude 40° in easternmost United States.

While the key is in general dichotomous, the intermediates between the recognized species are, for simplicity, merely inserted between the lines leading to their relatives. Whether they are really hybrids, or represent stages in evolution of one entity into another, can not be decided at present.

The entities comprised in the key are for the most part those recognized by Bailey and Stearn, and the nomenclature of the latter author is adopted

here. However, the plant entered as No. 10 is not very widely cultivated in American gardens, and is not mentioned by either author. Since its valid epithet under the rules of botanical nomenclature can not be ascertained until study of Asiatic literature and specimens becomes practicable, one of its horticultural epithets is here used.

In Reginald Farrer's famous work on the English Rock Garden only one member of the group under discussion was classed as "fitted in stature for our realm." This was assigned the name "*Funkia tardiflora*," but as that writer used epithets which happened to suit his fancy, with disregard of their validity or applicability, it is not now possible to tell to what plant he was referring. Actually, various forms and intermediates of the entities assigned numbers 8, 9, and 10 in the accompanying key are all well adapted to rock garden culture.

FLOWERS over 8 cm. long, horizontal to ascending, nocturnal, pure white, very fragrant; height of foliage-mound 50 cm.; leaf-blade ovate-subcordate, to 30 cm. long and 20 cm. wide, acutish; Aug. to mid-Sept. (NIOBE)

1. *H. plantaginea*.
Syn., "alba"; "subcordata." Corolla-length variants:
9 to 12 cm., h. v. *typica*.
12 to 15 cm., h. v. *grandiflora*.

FLOWERS under 8 cm. long, horizontal to declined, diurnal, violet or lilac to white, faintly fragrant. (*HOSTA* proper.)

COROLLA expanding more or less abruptly from a slender tube to a campanulate throat; hue tending to be deep; leaf-blade basally truncate to cordate.

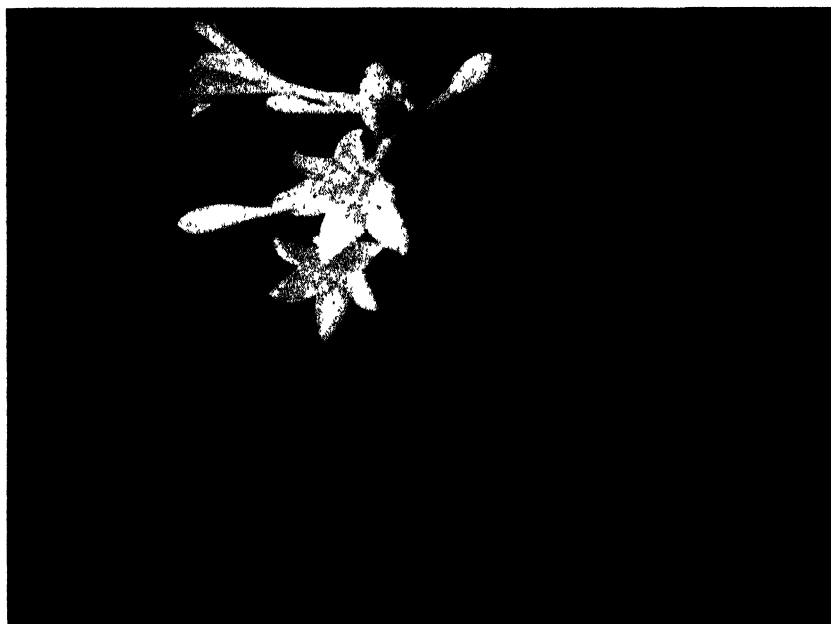
LEAF-TIP obtusish, subapiculate; blade to 15 cm. long; inflorescence to 60 cm. high; late July to late Aug. 2. *H. decorata*.

Syn., "Thomas Hogg." Leaf-color variants:
solid green, h. v. *normalis*.
white-bordered, h. v. *typica*.

(LEAF-TIP, blade-size, and blooming-period intermediate; "*H. ventricosa* h. v. *marginata*," etc. Intermediates of No. 2&3.)

LEAF-TIP acuminate; blade to 25 cm. long, late June to mid-July; inflorescence to 1 m. high 3. *H. ventricosa*.

Syn., "caerulea"; "ovata"; "speciosa."



Three Hostas

1. *H. plantaginea*; the flowers tend to ascend.
2. *H. decorata*; the corolla expands abruptly.
(The leaves in the background are *H. glauca*.)
3. *H. "albiflora"*; leaves oblong, obtusish; flowers white.

COROLLA expanding more or less gradually, the throat subcampanulate to funnelliform.

BASE OF LEAF-BLADE more or less cordate; peduncle bearing lanceolate scales.

INFLORESCENCE 60 to 100 cm. high, much exceeding the 20 to 40 cm. high foliage-mound; leaf-hue bright green; flowers spaced, sub-abruptly expanded, rather deep-hued; July..... 4. *H. fortunei*.

Syn., "sieboldii." Habit variants:

delicate with leaf-blades to 15 cm. long, h. v. *typica*.

robust with leaf-blades to 25 cm. long, h. v. *gigantea*.

Leaf-color variants:

solid green, h. v. *typica*.

white-bordered, h. v. *marginato-alba*.

(INFLORESCENCE, leaf-hue, and flower-features intermediate; variously named Intermediates of No. 4&5.)

INFLORESCENCE 50 to 60 cm. high, scarcely exceeding the foliage-mound; leaf-blades to 25 cm. long, strongly glaucous; flowers crowded gradually expanded, pale-hued; mid-June to early July 5. *H. glauca*.

Syn., "cordata"; "sieboldiana."

BASE OF LEAF-BLADE tapering to the petiole; blade-shape elliptic-ovate, lanceolate or oblong.

WIDTH OF LEAF-BLADE over 5 cm. and total number of veins 11 to 19; petiole manifestly winged; peduncle leafy; flowers 4 to 5 cm. long.

BLADE asymmetric and undulate, to 15 by 8 cm., centrally white-striped (or in late season pale-green); late June to July 6. *H. undulata*.

Syn., "univittata"; "variegata."

BLADE symmetrical and flattish, to 20 by 12 cm., green; July

7. *H. crromena*.

(WIDTH OF LEAF-BLADE, veins, petiole, peduncle, and flowers intermediate; "H. lancifolia h. v. fortis," "H. sieboldiana," "H. lancifolia h. v. albomarginata" of Stearn, not Hooker, "H. aoki," etc.

Intermediates of No. 7&8.)

WIDTH OF LEAF-BLADE mostly less than 5 cm. and total number of veins 7 to 11; petiole obscurely winged; peduncle bearing scales.

BLADE-OUTLINE elliptic-lanceolate, acuminate; flowers lavender to lilac.

PETIOLE to 20 cm. long; flowers 4 cm. long, spaced; Aug. to Sept..... 8. *H. lancifolia*.

Syn., "japonica"; "lanceolata." Leaf-color variants:

solid green, h. v. *typica*.

white-bordered, h. v. *albomarginata*.

(PETIOLE, flowers, and blooming-period intermediate; "H. lancifolia h. v. tardiflora" of American horticulturists, etc.

Intermediates of No. 8&9)

PETIOLE to 10 cm. long; flowers 3 cm. long, crowded; Oct.

9. *H. tardiflora*.

BLADE-OUTLINE elliptic-oblong, obtusish or acutish; flowers white; Sept..... 10. *H. albiflora*

Bamboos in American Horticulture (IV)

ROBERT A. YOUNG¹

The preceding three contributions² to the knowledge of bamboos in American horticulture have been devoted entirely, with the exception of some general introductory remarks, to consideration of the characteristics and habits of some of the more important or well-known hardy, running bamboos of temperate eastern Asiatic origin that have been introduced at one time or another into the United States. In the present paper some bamboos of the "clump," or sympodial type, from tropical and subtropical regions, will be considered.

The Clump-forming, or Tropical, Type of Bamboo

In habit of growth, as was briefly indicated in the first paper, in the issue of July, 1945, the clump type of bamboo differs conspicuously from the running type (with its much-elongated horizontal rhizomes) in that a new rhizome always grows directly from the underground base of a developed culm and, immediately or with a very short intervening horizontal growth, turns upward to form a new culm. There are often several buds on the culm base and so there may sometimes be two or three new culms arising from the base of a single culm. From each of these newer culms, again, one or more others arise, and so on indefinitely. An illustration of the basal portion of a very young clump of this type, showing the general mode of development, appears on another page. It will be seen that the rhizomes giving rise

to the 3d- and 4th-year culms first grew deeper before turning upward to form the culms.

The clump bamboos that have been successfully introduced into the warmest parts of the United States and its tropical dependencies (the Philippine Islands are not being considered here), belong principally to the genera *Bambusa*, *Cephalostachyum*, *Dendrocalamus*, *Gigantochloa*, *Guadua*, and *Sinocalamus*. One or two species each of *Lingnania*, *Oxytenanthera*, and *Schizostachyum* have also been introduced but they are established in only one or two places and will not be considered in the present article. All of the genera named, except *Guadua*, are Asiatic or East Indian; *Guadua* is tropical American.

The Genus Bambusa

The genus *Bambusa* has a wide natural distribution in the Old World Tropics—southern Asia, the East Indies, and Africa—and contains bamboos of great range in stature and in many other characters, horticultural and botanical. No attempt to detail these here will be made, but some of the characters of horticultural interest will be referred to in considering the several species and varieties with which we shall be concerned.

Commonest among the clump bamboos in the south Atlantic and Gulf region of the United States and in the milder parts of California is the extremely variable, oriental "hedge" bamboo, *Bambusa multiplex* (Lour.) Raeusch. (*B. nana* Roxb. var. *normalis*, Makino ex Shirosawa). Because of the wide cultivation of the various forms or varieties of this species and the

¹U. S. Department of Agriculture; Agricultural Research Administration; Bureau of Plant Industry, Soils, and Agricultural Engineering; Division of Plant Exploration and Introduction.

²Natl. Hort. Mag. 24:171-196, July 1945; 24:274-291; Oct. 1945, 24:40-64, Jan. 1946.



Robert N. Jones

View of entire lower portion of very young clump of Bambusa tulda, showing development from early seedling stages (extreme left) to the fourth year, when a much larger, characteristic culm (right) has emerged.



Robert N. Jones

*A clump of the type form of Bambusa multiplex, about 25 feet high,
Oneca, Florida.*

consequent interest that is likely to attach to them, it will be considered first and in some detail. Other species of *Bambusa* will be treated following, somewhat in ascending order of size. The forms of *B. multiplex* range in their ordinary maximum heights from 8 or 10 feet to more than 40 feet, but under very favorable conditions any of them may respond with larger growth. The species as a whole is probably the hardiest of all the bamboos of the clump type; the leaves of all varieties withstand temperatures down to about 17° Fahr. and some endure 15° with but little injury. *B. multiplex* is indigenous in southeastern Asia, and Dr. F. A. McClure has told

me of finding it in the wild in northern Kwangtung Province, China. It has long been cultivated in the East Indies, many parts of the Malay Archipelago, the Philippine Islands, and in the mildest parts of Japan.

There has been much confusion of names with reference to *Bambusa multiplex* and its various forms that have received names at the hands of botanists and horticulturists. Since there probably is nowhere at present full treatment of the subject in print, it seems worth while first to trace briefly the history of the naming of the species.

A bamboo now believed to represent the species type of *Bambusa multiplex* was described under the name *Arundo*

multiplex by the Portuguese botanist Loureiro, in 1790. It was transferred in 1797, by Raeuschel, to the genus *Bambusa*. The specific name *multiplex* in relation to the plant did not become known to other botanists, however, until the studies of Dr. E. D. Merrill, published in 1935 under the title "A Commentary on Loureiro's Flora Cochinchinensis" (Trans. Amer. Phil. Soc. n. s., v. 24, pt. 2: 83. 1935) disclosed the evident specific identity of *B. nana* Roxb. and its nomenclatural varieties with *B. multiplex*. It seems fairly certain that the bamboo described under the specific name *multiplex* represents the original wild form and it seems equally certain that the semi-dwarf, plain-green, fern-leaved garden form is the plant that was named *B. nana* by Roxburgh. Not having been aware as yet of the identity of the original wild form with the earlier-published *B. multiplex*, the Japanese botanist Dr. Tomitaro Makino named it

var. *normalis* under *B. nana*; this was published (in Japanese, but with Latin scientific name) in 1912, by Yoshio Shirozawa. However, in connection with this treatment of the plant, it was stated parenthetically by the author that, although the Latin name would imply that the plant *B. nana* was the "mother" species, it was in reality a variety of the one that was being named var. *normalis*.

It will perhaps be useful before more detailed discussion of the recognized and named horticultural varieties, or forms, of *Bambusa multiplex*, to list them in tabular form, with very brief characterizations and with some of the botanical or horticultural synonyms by which they have been designated in the literature and in nursery catalogs. The order of listing is somewhat arbitrary but is based mainly on stature and the character of the foliage of the several forms. The list follows:

Bambusa multiplex (Lour.) Raeusch.

Forms of the species

Some Botanical or Horticultural synonyms

Typical form

Plant plain green, leaves normal, culms up to 35 ft. tall.

Bambusa nana var. *normalis*; *B. argentea*; *B. nana* var. *argentea*.

Horticultural Varieties

Variety Silverstripe (some leaves yellowish or white striped; internodes of culms often with slender yellowish stripes; up to 40 ft.)

B. argentea striata; *B. nana* var. *argentea-striata*; *B. nana* var. *variegata*; *B. argentea* var. *vittata*; *B. nana* var. *normalis* f. *vittato-argentea*.

Variety Alphonse Karr (culms yellow, prominently green striped. up to 35 ft.)

B. alphonse-karri; *B. nana* var. *alphonse-karri*; *B. verticillata*.

Variety Willowy (plain green; culms and branches slender, drooping; culms up to 20 ft.)

None.



P. H. Dorsett

A mature, spreading clump of Variety Silverstripe of Bambusa multiplex, growing in deep sandy soil and fully exposed to sunlight at Gotha, Fla. Height about 25 feet.

Variety Fernleaf (plain green; usually dwarf, culms rarely 20 ft.; foliage fernlike)

B. nana; B. disticha; B. nana disticha.

Variety Stripestem Fernleaf (foliage green, fernlike; culms yellowish, green striped, up to 10 ft.)

B. disticha; B. striata; B. nana f. viridi-striata.

Variety Silverstripe Fernleaf (somewhat dwarf; foliage fernlike, with some leaves white striped).

B. nana f. albo-variegata.

B. multiplex. Hedge bamboo. Typical form: This form of the species, a clump of which is shown on page —, is considered, as already stated, to represent the original wild plant from which all other forms have arisen. It is normally plain green throughout. Its maximum height is about 35 feet where soil and moisture conditions are suitable and winter temperatures do not often fall lower than 17° Fahr. The

branches range in number from several at the lowest branching node to 30 or more at some of the higher nodes. At each of these nodes there is a primary branch of considerable length, with a pair of sub-equal smaller ones—one on each side—arising from two of the extremely crowded basal nodes of the primary branch. Along with the growth of these three branches, a varying number of small to diminutive



A more upright clump of the same variety as on page 261, about 37 feet tall, growing in heavy rich soil, partly surrounded by other tall growth, on the McIlhenny estate, Avery Island, La.

branches and twigs develop successively within a year, from the much-crowded basal nodes of the earlier ones. This branching habit is common in its essentials to all forms of the species. The primary branch and sometimes the two succeeding ones also give rise to branchlets at some distance from the base. The lanceolate to narrowly oblong leaves, vivid green above and strikingly bluish glaucous or silvery beneath, range from about $1\frac{1}{2}$ to 5 inches in length. This silvery under-surface gave rise to the specific or varietal name "argentea" by which the typical form of the species has often been known. The culm sheaths of the type form are devoid of special color markings and the auricles at the base of the rather long sheath blade are

poorly developed or absent. The sheaths of all the forms are tardily deciduous. Depending upon temperature and moisture conditions, the new culm shoots of *B. multiplex* (and of its different forms) appear from May to July in the various latitudes in which the species grows in the continental United States—about as far north as Beaufort, S. Car., on the Atlantic coast. Local weather conditions also influence the time of sprouting. Late-sprouting culms commonly do not extend their branches until the following spring but remain as bare poles during the autumn and winter. Although the young shoots have not generally been considered edible, the very young ones—before they emerge from the ground—are reported to be eaten in the Dutch East



A young clump, 15 feet in height, of Variety Alphonse Karr of Bambusa multiplex at Mr. E. A. McIlhenny's estate, Avery Island, La.

Indies (Ochse, P. J. Vegetables of the Dutch East Indies (English ed.), p. 302. 1931). The culms, which are rather slender and seemingly not very tough, do not appear to have important industrial uses. The species and its varieties are valuable chiefly for ornamental plantings. In hedge use they respond well to pruning when this

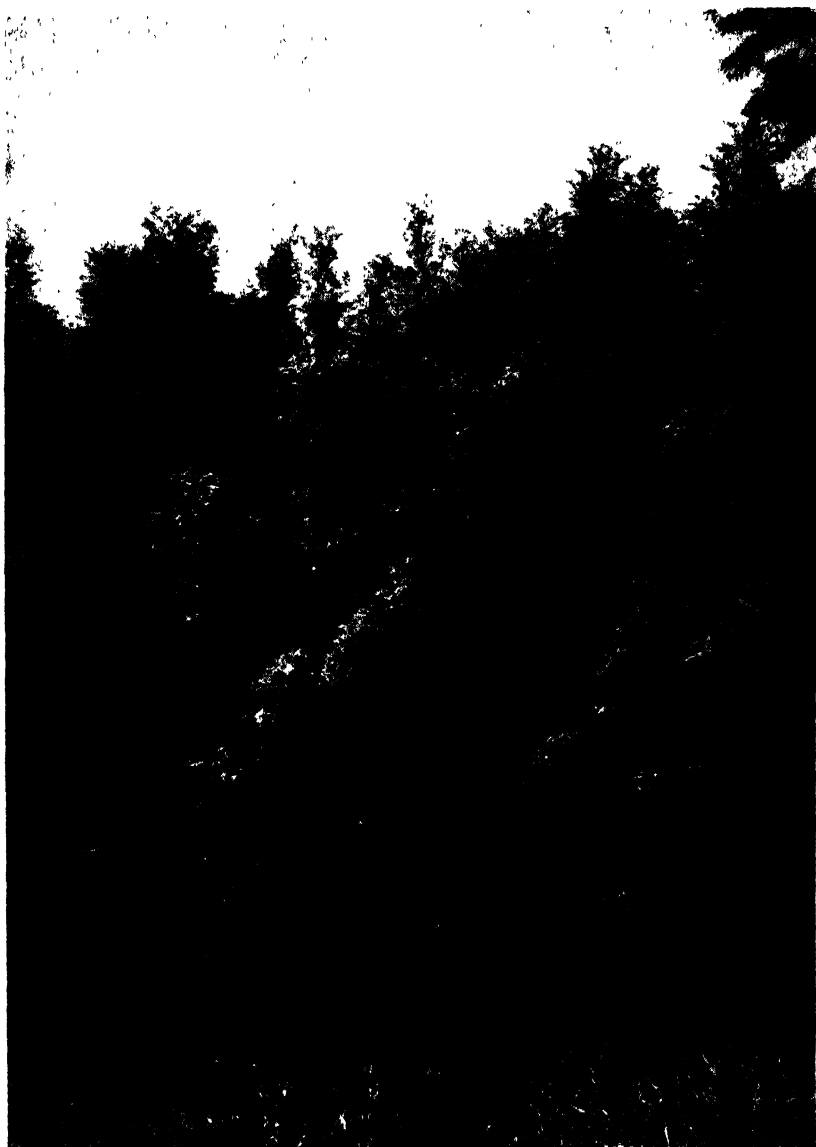
is desired. The type form is growing on the island of Oahu, Hawaiian Islands, according to specimens received some years ago from Mr. Edw. L. Caum of the Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu. To the synonyms of the typical form in the tabular list of varieties may be added *Leleba multiplex*.

Karr. Alphonse Karr hedge bamboo. This might be called the Golden striped hedge bamboo if another name were wanted. It grows to 35 feet or more tall, about the same height as the type, as far as I have observed, though the late Henry Nehrling wrote of a height of more than 50 feet attained by a large clump at Oneco, Fla. The variety differs from the type mainly in the coloring of the culms and branches. These are usually at first bright golden yellow with conspicuous longitudinal green stripes of different widths irregularly spaced on the internodes. The leaves, commonly much like those of the type, are sometimes larger, and I have seen them up to $7\frac{1}{2}$ inches in length. A view of a developing clump of this variety at Avery Island, La., is shown on page 262. The habit of growth changes with age, and I have seen a more mature clump at Avery Island, in which the upper parts of most of the culms carried heavy masses of foliage resembling those shown in the clump of Variety Silverstripe at Gotha, Fla. The fresh culm sheaths are yellowish, with green stripes, just the reverse from the condition in Variety Silverstripe; they dry to pale brownish, with the stripes becoming straw color. Besides the three synonyms given in the table, the following botanical and horticultural combinations for Variety Alphonse Karr have appeared in print; *B. nana* var. *normalis* f. *alphonso-karri*; *B. multiplex* var. *normalis* f. *alphonso-karri* (name only); *Leleba multiplex* f. *alphonso-karri*. The Japanese name is Suochiku.

B. multiplex, Variety Willowy. Willowy hedge bamboo. The varietal name of this form of the species was suggested by the habit of growth of mature clumps. The entire plant is plain green except for the silvery glaucous under-surface of the leaves; the leaves are slender, $1\frac{1}{2}$ - $4\frac{1}{2}$ inches long by $\frac{1}{8}$ - $\frac{3}{8}$

inch wide. The culm sheaths dry to a dull straw color. Heights up to 20 feet, with culm diameters not exceeding $\frac{3}{4}$ inch near the base, are attained; the branches also are very slender. Culms that approach the maximum height tend strongly to droop or bend, even without the masses of foliage that cause excessive bending in other varieties. In younger clumps, with culms up to 10 feet high, the drooping tendency does not appear, even though the stems are slender. The lowest internodes are solid and the higher ones thick-walled, which would account for the erect growth during the early development of a clump. A view of a hedge grown to full height, at Hillcrest Cemetery, Savannah, Ga., is shown on page 264. My first acquaintance with this form of *B. multiplex* was made at Mr. E. A. McIlhenny's place, Avery Island, La., in 1932, just before the hedge at Savannah was closely observed and photographed. The variety had not previously been reported in the literature, so far as I know, and it was first listed (with a brief descriptive note) as a horticultural variety in the second edition of Standardized Plant Names.

B. multiplex, Variety Fernleaf. Fernleaf hedge bamboo. A clump of this somewhat dwarf variety, growing on the grounds of the Florida Experiment Station, Gainesville, Fla., is shown in a view on page 265. A moderately low, well-trimmed, bamboo hedge, long grown at that Station, is also of this variety. This demonstration hedge shows the entire practicability of using such a bamboo for the purpose. The fern-leaved character of this variety results from the increase in number and reduction in size of the leaves from the normal numbers and sizes in the type. The number of leaves on a branch or twig doubles or triples, and the size of the individual leaf may be reduced



Side view of a 9-foot hedge of Variety Stripestem Fernleaf of Bambusa multiplex at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

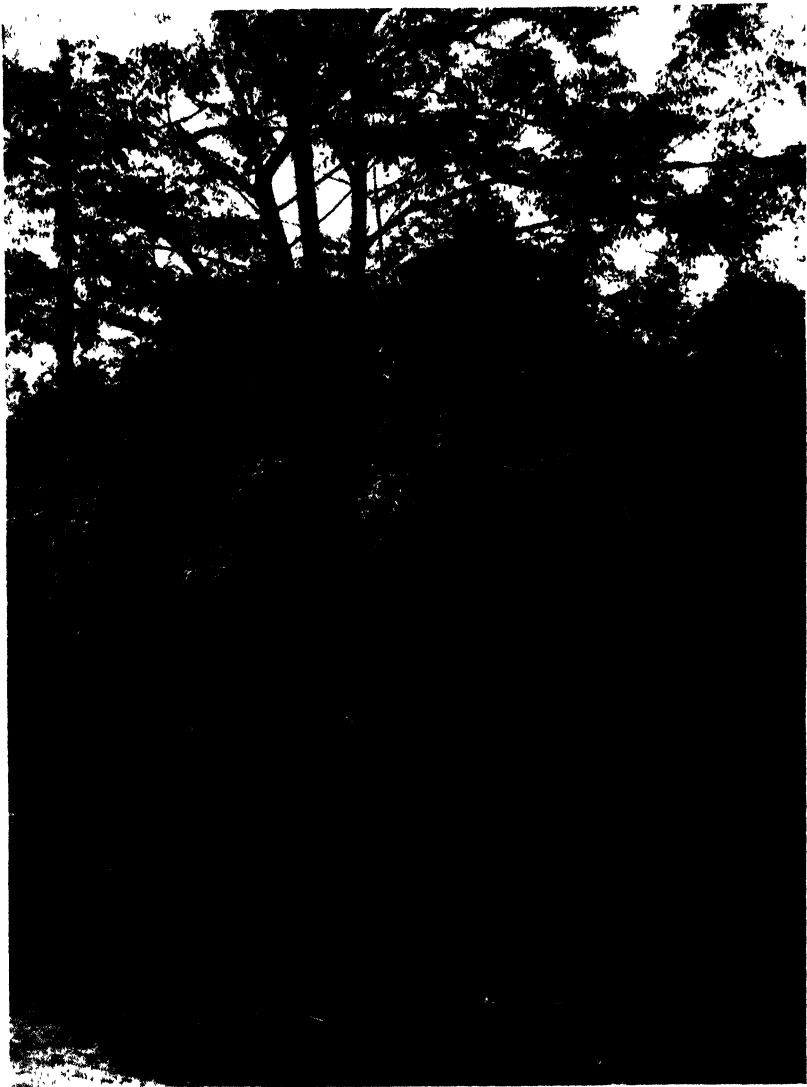
by two-thirds or more from that in the type, with the leaves crowded toward the end of the branch or twig. This gives a conspicuously 2-ranked,

or distichous, effect which is reflected in the horticultural name "disticha" that sometimes has been used for it. The entire plant is plain green and dif-

fers little from the type except in its varying degrees of dwarfness and the change in foliage characters. The culm sheaths dry to a dull straw color. The variety is not stable but frequently reverts to the type in respect both to stature and character of foliage. In some instances, in soil not very rich, a clump may keep its varietal characters perfectly for several years before beginning noticeably to revert. Reversion occurs more frequently when the fertility of the soil is increased or when small plants of the variety are planted in richer soil than that in which previously grown. However, the culms may sometimes grow considerably taller and still retain the fernleaf type of foliage. An example of this was observed many years ago at the water tank on the Florida Experiment Station grounds. The clumps of bamboo were growing in deep sandy soil but received light irrigation from the tank. They had reached a height at that time estimated at about 22 feet and still kept the fern-leaved foliage, except that a one-fourth section of one of the 4 clumps had reverted to the normal foliage of the type form of the species. The variety Fernleaf, as stated earlier, is understood to represent the plant originally described under the name *B. nana* by Roxburgh. The Japanese name for it is Ho-o-chiku, meaning "phoenix bamboo." This variety is growing in Hawaii. To the list of Latin synonyms already given should be added *Leleba floribunda*.

B. multiplex, Variety Stripestem Fernleaf. Stripestem Fernleaf hedge bamboo. A view of a 9-foot hedge of this variety, growing at the U. S. Barbour Lathrop Plant Introduction Garden, near Savannah, Ga., appears on page 267. As the varietal name indicates, the culms are striped and the foliage is of the fernleaf type. There are 10-20 leaves, $\frac{5}{8}$ -1 $\frac{1}{2}$ inches long,

on a twig. Yellow is the ground color of the slender culms and the green stripes are irregular in width and in number on the internodes. The culm sheaths dry to a dull straw color. The variety closely resembles the wholly green variety Fernleaf except in the color markings of the culms and in its usually more dwarf stature. The culms and branches tend to be erect in habit except where forced otherwise by density of the growth. The masses of small foliage in the hedge form a perfect screen. Such a hedge or a much lower one could be pruned to a formal shape if it were so desired, with results as satisfactory as obtained with Variety Fernleaf at Gainesville, Fla. Frequent pruning probably would be necessary during the warm months. Like the ordinary Fernleaf variety, this one also develops culms in the course of time that bear the larger, normal leaves of the type form. Dwarfness and the fernleaf character probably are best preserved when the bamboo is grown in soil not high in fertility. The variety Stripestem Fernleaf, under another horticultural name, "*B. disticha*," came to attention in the southeastern states through the propagation of it by Mr. C. E. Pleas, Chipley, Fla., in the early twenties. He had obtained his first plant earlier from an unnamed source in South Carolina. Some years later it was learned that the same variety under the name "*B. striata*" was in the nursery trade in southern California. The earliest known record of the variety in literature is in the excellent work (in Japanese, with color plates) Chikurui Zufu Kaisetsu (Monograph of Bamboos; 1st ed. 1914), by the famous Japanese horticulturist and bamboo specialist Mr. Isuke Tsuboi. In collaboration with the botanist Dr. T. Makino he described the plant and published for it the scientific name *B. nana* var. *typica* f. *viridi-striata*.



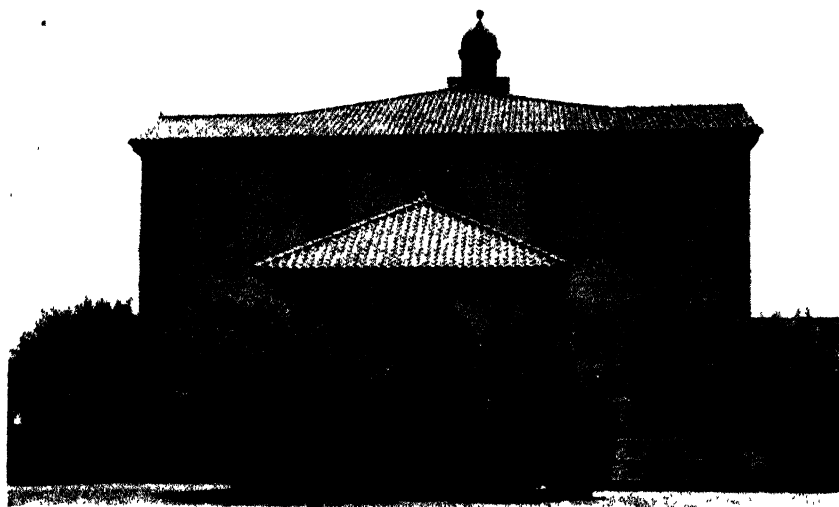
D. A. Bisset

End view of a 9-foot hedge of the Chinese goddess bamboo, at the Barbour Lathrop Plant Introduction Garden, near Savannah, Ga.

Another Latin synonym is *Leleba floribunda* f. *viridi-striata*. The Japanese name is Beni-ho-o-chiku.

Bambusa multiplex, Variety Silver-stripe Fernleaf, is a sixth form of the

species that has received recognition by being named. It was described from Japan by Makino in 1917, under the name *B. nana* f. *albo-variegata*. No record of its introduction into this



*View of one of the buildings of Louisiana State University, Baton Rouge, La., recently planted with variously developed clumps of different varieties of *Bambusa multiplex*.*

no cutting back of the tops were judiciously placed, and the results in general, as those shown in the photograph, seemed very satisfactory.

Bambusa textilis McClure is a medium-large and fairly hardy bamboo from southern China. It was collected at Heunglokeuk, Kwangtung Province, by F. A. McClure, who was then with Lingnan University, Canton. A view of a 9-year-old clump about 40 feet high, at the Federal Experiment Station in Puerto Rico, at Mayaguez, is shown on page 273. The culms were of diameters up to 2 inches. *B. textilis* is cultivated in China for its thin-walled but tough culms, which are split and extensively used in the weaving of mats, hats, and baskets and for making rope. The species is among the hardiest of the clump bamboos, being excelled in this respect only by the hardier varieties of *B. multiplex* and by the Chinese goddess bamboo. It

has withstood temperatures down to about 17° Fahr. at Savannah, Ga.

The culms of *B. textilis* are erect and unusually straight, with nodding tips. The culm sheaths, stiff and somewhat brittle when dry, are glabrous, and they dry to a brownish tan; the apex of the sheath proper is wide and forms a nearly symmetrical arch from both edges, the arch extending a little lower on one edge, and the ligule is low. The blade is very broadly lanceolate, nearly as wide as the apex of the sheath, and somewhat broadly subcordate at the base; the base is extended on each side as two rather small, unequal, delicately fringed auricles. There are 6 to 10 branches at a node and they differ less in size than do the branches of most related bamboos. The foliage is attractive and distinctive, the leaves on the primary branches being up to about 8 inches long and an inch wide, while the others rarely exceed 6



F. A. McClure

*View of a developing clump of *Bambusa textilis* at the Federal Experiment Station, Mayaguez, Puerto Rico; at this stage (in 1943) it is nearly 40 feet tall. Note the exceptionally straight culms.*



F. A. McClure

View of a large clump of Bambusa ventricosa, about 40 feet tall, at McKee Jungle Gardens, Vero Beach, Fla. At right are tall culms of Sinocalamus Oldhami, at left unidentified bamboo.

inches by $\frac{5}{8}$ inch. The adult culms are free of branches to a greater proportional height than in almost any other bamboo. A bamboo such as this, with straight, light, and tough culms, with non-prominent nodes, seems to possess high potential value.

Bambusa ventricosa, McClure, a splendid 40-foot clump of which, at the McKee Jungle Gardens, is shown on page 274, is another comparatively hardy bamboo from southern China. It was collected in cultivation at Canton by F. A. McClure for the U. S. Department of Agriculture, in 1925. It has withstood temperatures down to about 20° Fahr. in this country. In China it is commonly grown as a pot or tub plant, because in the early stages of development of a clump, and persistently in the dwarfed growth induced by pot culture, the internodes of the culms and many of the branches are quite

regularly shortened and enlarged in a curious manner that gave rise to the Chinese (Mandarin) name Fu-tu-chu (Fat-t'o chuk in Cantonese); meaning literally, "Buddha's belly bamboo." The characteristic distortion is shown on page 275. The shorter name "Buddha bamboo" has been in use in this country for several years, but a number of travelers who have acquaintance with Oriental tradition and thought have felt that this unnecessarily obscures the significance of the original name. There is something to be said for this view and, reversing an earlier opinion, I shall not regret it if the more expressive full name comes into general use for this unique and handsome bamboo.

It is to be remembered, however, that when a small plant or clump is grown in the open and it becomes established, the habit of producing swollen internodes is soon discarded and the inter-

nodes stretch out to their normal lengths of several times as long. It should be added here that the tallest culms in the clump photographed at Vero Beach, Fla., are reported now to be 55 feet high. Without the change to an adult habit of growth, probably no heights greater than 7 or 8 feet would be achieved. In China, the plant is as yet known only in its dwarf state. The branches on normal culms in younger clumps are usually 3 at a node and unequal in size, but sometimes there are 2 or more additional smaller ones. Branches borne by dwarfed culms are sometimes single at the nodes. There are commonly 6-8 leaves at the ends of branches or on twigs, and they range up to $5\frac{1}{2}$ inches long and from $\frac{1}{8}$ to $\frac{5}{8}$ inch wide on dwarfed plants. On larger plants the size of leaf may increase to 7 inches long and $\frac{5}{8}$ inch wide. The normal culm sheaths are long for their width, noticeably unsymmetrical, coriaceous, glabrous, with the veins on the dry sheaths prominent and giving a striate effect; the apex of the sheath proper is rather wide, gently arched near the center, and the ligule is low. The blade is distinctly unsymmetrical and as wide as the apex but is a little constricted near the base, which is slightly extended to form two diminutive and unequal auricles. A much more detailed account of the dwarf phase of this strange bamboo accompanies the original description and publication of the species in Lingnan Sci. Journ. 17: 57-62. Canton. 1938. The qualities of the culms of *B. ventricosa* have not been determined.

Bambusa longispiculata Gamble is a medium-large bamboo, closely related to *B. tulda* but reaching heights of only about 45 feet. The culm sheaths strongly resemble those of *B. tulda* but the pair of auricles is more nearly equal than is usual in the latter species. The leaves are fairly large, ranging from



Robert Taylor

Section of culm of *Bambusa ventricosa*.

about 3 to 9 inches in length and from $\frac{1}{2}$ to 1 inch in width. The species is being used in a hillside planting for erosion control at the Federal Ex-

periment Station in Puerto Rico. Culms up to 40 feet tall have been produced. Some of the original plants, grown from seed received by the U. S. Department of Agriculture from Dehra Dun, India, in 1931, were under close observation at the Station during the early years of their growth, and it was noted that they soon exhibited marked differences in growth habits and in details of some of the vegetative organs, including the culm sheaths. This experience has served to emphasize the fact that such differences frequently do occur among bamboo seedlings as well as in other types of plants. *B. longispiculata* is about equal in hardiness to *B. tulda*, the critical temperature for both being about 27° Fahr.

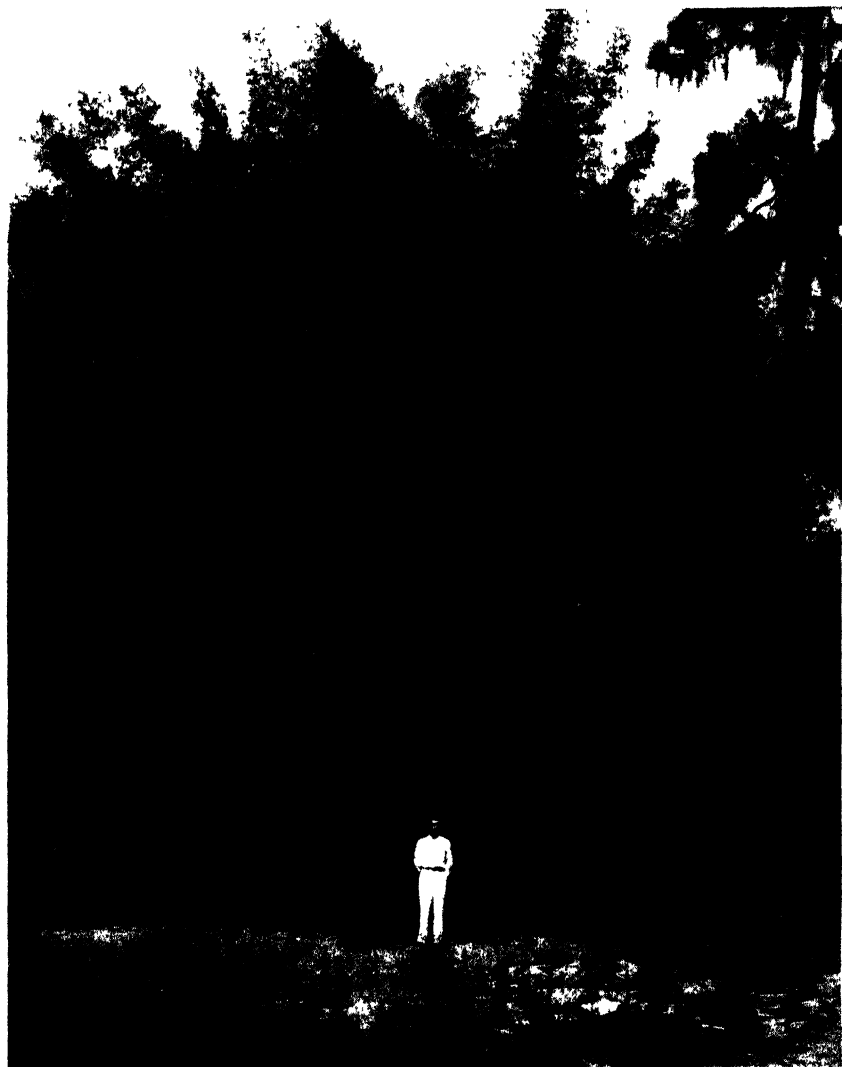
Bambusa tuldoidea Munro, a magnificent clump of which is illustrated on page 277, is believed to be native in southern China, and it is said to be the most important economic bamboo in that region. It has long been in cultivation in some of the mildest parts of southern Europe and in many mild-wintered localities in the southern and southwestern United States, until recently under the horticultural name *Bambusa Thouarsii*. It is semi-hardy, withstanding temperatures down to 20° Fahr. The species apparently was introduced very early by world navigators into southern Brazil, for by 1883 it had so well established itself that it was described by the botanist Doell as an indigenous bamboo and named *Guadua pallescens*. It is now widely cultivated in Brazil, northern Argentina, and adjoining countries.

B. tuldoidea is a handsome medium-giant bamboo growing to 55 feet in height, with remarkably slender culms, the tallest only about 2¼ inches in diameter near the base; they are fairly thick walled. The branches are several at a node and the number of leaves on a branch or twig ranges from 5 to 12. The dark-green leaves are variable on

the twigs and branches, as in all bamboos, but they average medium large; they range from 2½ to 10 inches in length and from ⅜ to 1 inch in width. The culms are extensively used in China for propelling small boats, or "punts," in rivers and streams. In allusion to this use, the English common name "punting-pole bamboo" was proposed by Dr. F. A. McClure in *Standardized Plant Names* (2d ed.). The Chinese name is Chaang ko chuk.

As already indicated, *B. tuldoidea* has been known under various names in different regions. The use in this country and in Europe of the horticultural name *B. Thouarsii* for it, when there was already a published scientific name *B. thouarsii* Kunth, a synonym of *B. vulgaris*, gave rise to misunderstanding that resulted in the publication of an illustration of a typical clump of *B. tuldoidea* mistakenly captioned *B. vulgaris* in U. S. Department of Agriculture Bulletin 1329 (1925). Later attempts, before the synonymy was fully worked out, to determine and bring into use the correct scientific name of *B. Thouarsii* Hort. led first to the mistaken use by the present writer in correspondence of the name *B. longispiculata* (which name was involved in the synonymy) and then the use of the synonym *Bambusa pallescens* (Doell) Hackel (*Guadua pallescens* Doell). The identity of *B. Thouarsii* Hort. with *B. pallescens* was established through an exchange of specimens by the U. S. Department of Agriculture with Dr. P. Campos Porto, Director of the Instituto de Biológico Vegetal, Brazilian Department of Agriculture, Rio de Janeiro, in 1934; and in 1936 Dr. F. A. McClure determined the identity of both with *B. tuldoidea*, which seems to have closed the chapter on these questions of name. Another synonym is *B. guadua*.

Bambusa vulgaris Schrad. ex Wendl. is one of the most widely grown of all



• *Large clump of *Bambusa tuldoidea*, 55 feet tall, at Mr. Julian Nally's place, Gotha, Fla.; Mr. Nally in center.*

bamboos in tropical and subtropical regions of both Hemispheres, though the chief reason for this seems to be its large size—up to 70 or 80 feet high—and ease of propagation and cultivation in all nearly frostless localities; it suffers some frost injury at 30° Fahr. and at 28° usually is killed to the ground.

Its original habitat is not definitely known but is generally believed to have been India, though one author has suggested its spontaneous appearance also in other regions, including Java and Madagascar. At its best, the species makes an attractive, though rather too-open clump; the culms usually are dis-

tinctly arching. The open-clump habit results from the horizontal growth of the rhizomes for distances up to about $2\frac{1}{2}$ feet before turning upward to develop into culms. A view of a clump clearly exhibiting this character is shown on page 279.

The culm sheaths of *B. vulgaris* are highly characteristic and the lower ones are much shorter than broad; the apex of the sheath proper is very wide, with the center arching gently, and the ligule is of medium height, with finely notched, shortly ciliate, margin. The sheath is at first covered on the outside with short, appressed, stiff brown hairs, most of which gradually fall off. The blade of the lower sheaths is short and broad, and much narrower than the apex of the sheath, but a pair of prominent fringed auricles extends to the edges of the sheath; the inside of the blade is at first densely brown-hairy but much is lost on drying. The sheath dries to a pale brown. The leaves are fairly large, 4-9 inches long and $\frac{1}{2}$ - $1\frac{1}{8}$ inches wide. Largely because of the effects of even light frosts, a fully satisfying clump is exceedingly rare in southern Florida.

The wood of *B. vulgaris* is rather soft and, from the standpoint of quality, is one of the least valuable among large bamboos. Notwithstanding this, furniture and other articles can be made from the culms, and some extensive investigations in this field have been made in recent years in Puerto Rico. Because of the size of culms and ease of growing, the species has been used for paper pulp. A paper mill was erected in the Island of Trinidad 10 years ago to utilize the culms from an area said to be about 500 acres in extent of this species, that had been planted 20 years earlier. The mill closed later, at least for a period, when the price of paper became too low.

Bambusa vulgaris var. *vittata* A. & C. Riviere is smaller than the type and

differs otherwise in having yellow culms with longitudinal green stripes on the internodes. It is of Asiatic origin. The variety has been grown at a few places in southern California and southern Florida. A synonym is *B. vulgaris* var. *striata*.

Bambusa polymorpha Munro is a handsome giant bamboo said to reach heights of 75-90 feet, with culm diameters up to 6 inches. The wood of the culm is reported from the Federal Experiment Station in Puerto Rico to be very dense and exceedingly hard—almost flintlike. The species has attained 40 feet high there. A view of several clumps rather near together, at the Canal Zone Experiment Gardens, Summit, Canal Zone, appears on page 280. The characteristic extremely close growth of the culms, with entire absence of branches on the lower parts, is clearly shown. The branches and twigs are long and slender, and the leaves are among the smallest and slenderest of any of the clump bamboos, except the fern-leaved types, that are being considered. They range from $1\frac{1}{2}$ to $7\frac{1}{2}$ inches long and $5/16$ - $7/16$ inch wide. This results in a distinctive beauty of the foliage that is only partly revealed in the present photograph. The culm sheaths are distinctive in having very prominent auricles, profusely margined with long, stiff bristles. The sheaths are exceedingly stiff and are densely covered with fine appressed stiff hairs, rather easily rubbed off, giving them a silvery gray appearance when dry. There are few living specimens of *B. polymorpha* in southern Florida but probably the best is one at the McKee Jungle Gardens at Vero Beach. Its present height is about 30 feet.

Bambusa tulda Roxb. is a giant Indian bamboo reported in its ordinary large form (there are two or more smaller ones) to attain heights up to 70 feet or more. It does not endure



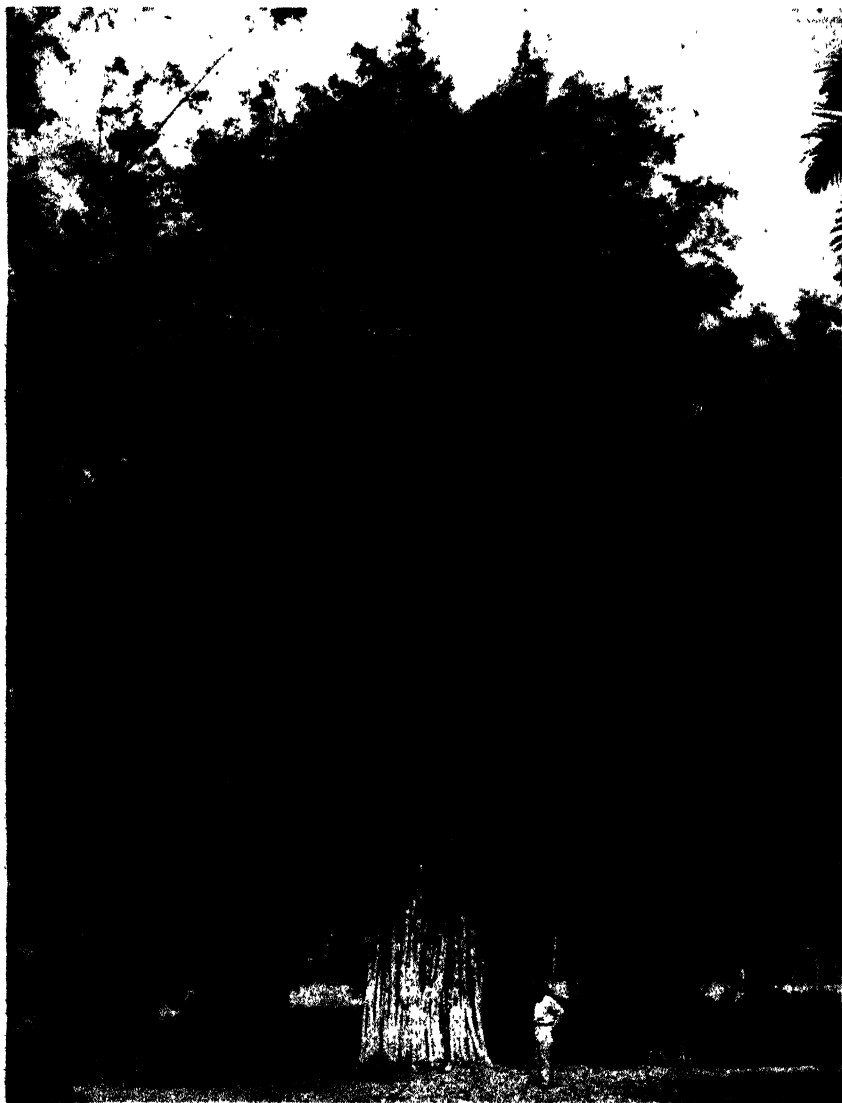
E. L. Crandall

Characteristic open clump of Bambusa vulgaris, at Mr. W. J. Matheson's place, Biscayne Key, Fla.

temperatures lower than about 27° Fahr. The adult culms are straight, robust and very thick walled, and the wood is fairly dense. There are the usual 3 larger branches with several much smaller ones at a node, with 6-10 leaves on each. The leaves are often large, ranging from 3 to 10 inches in length and from $\frac{1}{2}$ to $1\frac{1}{8}$ inches in width. The lower culm sheaths have a broad, short blade, with a pair of prominent auricles, one of which usually is prolonged over and adherent

to the "shoulder" of the sheath and is distinctly wavy, or crinkled.

A near view of a clump of *B. tulda* nearly 6 years old at Culebra, Canal Zone, is shown on page 281. The plant from which this clump grew was from the first successful introduction (P. I. No. 21002) of the species made by David Fairchild of the U. S. Department of Agriculture, from Calcutta, India, in 1907. A plant of the same introduction was sent to the Federal Experiment Station at Mayaguez.



James Mitchell (OFAR)

Medium-sized clumps of Bambusa polymorpha at Canal Zone Experiment Gardens, Summit, C. Z. Note the unusually compact growth.

Puerto Rico. It is not possible to state with certainty whether the plant at Mayaguez survived, as the record is not entirely clear, but, at least, one of similar type received apparently near that time, did become established

and has thrived. A third specimen plant of the 1907 introduction was sent to the late Henry Nehrling, at Gotha, Fla., and is still growing on the place, now owned, as previously mentioned, by Mr. Julian Nally. It



Courtesy Acting Superintendent, Ancon Hospital

*5-year-old clump of Bambusa tulda at Ancon Hospital, Culcra, Canal Zone.
(Photographed in 1913.)*

was a noble clump 60 feet or more high, with culm diameters of over 3 inches, when I visited Gotha in 1937, although it had been frozen to

the ground at least twice, I believe, in earlier years. The species is also growing on the island of Oahu, in Hawaii.



A. G. Galloway

A giant clump of the great thorny Indian Bamboo, Bambusa arundinacea, near Auburndale, Fla. The height is 75-80 feet. This clump was killed to the ground in a severe freeze shortly after this photograph was taken.

A smaller form of *B. tulda* appeared among plants grown by the Department of Agriculture from seed (P. I. No. 74413) received many years ago from the Forest Research Institute, Dehra Dun, India. The greatest height

thus far reported for this form is about 30 feet. It cannot be stated at present whether one only or several of the seedlings were of this smaller form. It also appears to be less attractive than the normal type in certain respects oth-

er than its smaller size. Another form, understood also to be of reduced stature, with yellowish striped culms and culm sheaths, was reported in private cultivation at Coconut Grove, Fla., some years ago.

The heavy-walled culms of the normal large type of *B. tulda* are used in construction and for other purposes in India, and numerous similar uses for them will doubtless be found in the Americas. Should the production of paper pulp from bamboo prove economically possible in tropical and subtropical America, this species may well be found one of the more valuable sources of raw material for growing in those latitudes.

Rambusa arundinacca Retz. is a very thorny, giant bamboo, one of the largest of the genus. It has been reported to exceed 100 feet in height. A photograph taken in 1927 of a great clump that stood for many years on the shore of Lake Marianna, near Auburndale, Fla., is reproduced on page 282. The clump was frozen to the ground shortly after this photograph was taken. This species, like *B. tulda*, is injured or killed at temperatures below 27° Fahr. The estimated height of 75 or 80 feet for this clump is not known to have been equaled as yet by any other bamboo in the United States. The culm walls are thick—about the same as in *B. tulda*, but the wood apparently is less dense. The primary branch at each of several of the lower nodes of the culm is elongated to vine-like length, with the secondary pair at the base of the primary modified into short, sharp thorns; the branchlets at the nodes of these lower primary branches are modified into similar thorns. Higher on the culm the branches and branchlets, or twigs, are decreasingly changed to thorns, or spines, until finally normal leafy ones only are found. With the tangle of vinelike thorny branches around the

base of a clump of this bamboo, it is well protected from larger browsing animals that might eat or otherwise destroy the new culm shoots as they emerge. (All herbivorous animals are extremely fond of young bamboo shoots in general.) The leaves of *B. arundinacca* are 5-6 on a branch or twig and rather small, averaging around 5½ inches in length and ranging from 2½ to about 7 inches, with widths of ¾ to ⅝ inch. The culm sheaths are highly characteristic in having a very dense appressed hairiness, blackish and furlike, on the inside of the sheath blade; the blade is short and very broad on sheaths at the lower nodes and is not separable from the sheath proper as in most bamboos.

The extreme thorniness of *B. arundinacca* and the great size that it ultimately attains restrict its usefulness in landscape planting to situations where space is ample. The removal of dead or old culms from a large clump, without undue injury to the branches of the remaining ones, will constitute something of an engineering problem. This giant bamboo develops rapidly from small vegetative propagations and, barring the thorniness of the culms and branches and the consequently greater cost of harvesting the mature culms, it appears to offer good possibilities as a source of wood for paper pulp in tropical and subtropical localities.

Species of the genera *Cephalostachyum*, *Dendrocalmus*, *Gigantochloa*, *Guaia*, and *Sinocalamus* that are established in cultivation in warm localities in the continental United States, Puerto Rico, and the Canal Zone will be treated in the next issue.

Correction

Attention is called to the transposition of the illustrations (but not the legends) on pages 49 and 51 in the issue of the magazine for January, 1946.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

Species Cyclamen

In the hills of Gascony, the country of d'Artagnan and Cyrano de Bergerac, I saw miniature cyclamen for the first time.

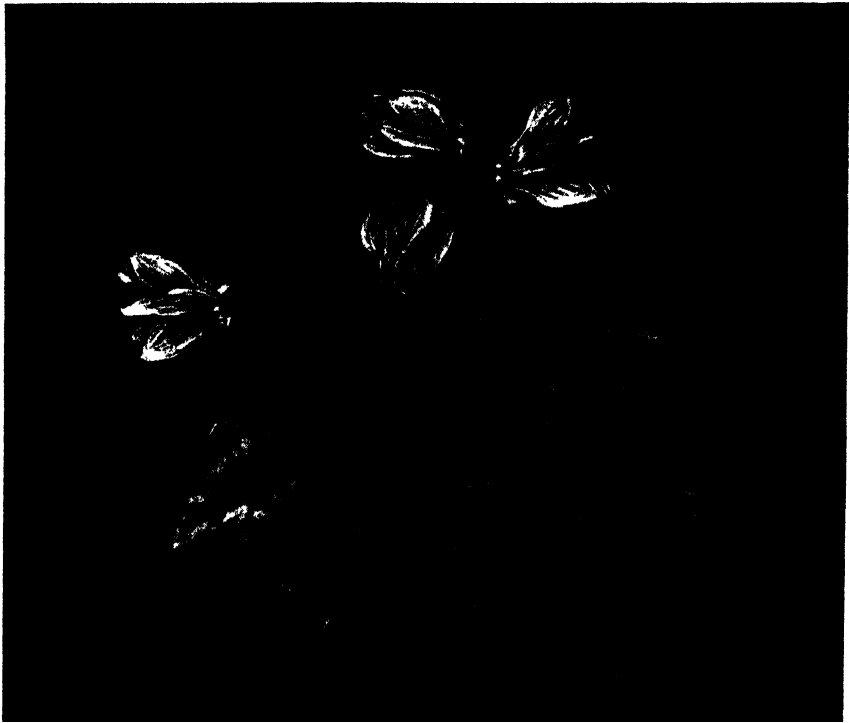
Gascony is a romantic, backward country, of stony vineyards, walled villages, and hilltop castles looking towards the Pyrenees. Here, in the seventeenth century, a house was built just for pleasure, hunting and dancing, with great rooms, huge stables, and below the terrace a formal garden. When I was there, times had changed; the parties were a dim memory, but all day the old walls rang to the laughter of children. The garden had gone wild, there were ponds and a winding stream where there had been fountains and canals; here and there a huge cedar of Lebanon, hedge trees and evergreens old and gnarled, far more beautiful than in their clipped prime; and everywhere the little cyclamen flowers, rose and white, above carpets of their exquisite ivy-like foliage.

That was years ago, but ever since wild cyclamen have symbolized for me the love of home and family. The old house is sad now, the gay children went out to die on the battlefields of the world, but the cyclamen bloom on, and little grandchildren are beginning to pick them.

Whenever I see "hardy cyclamen" seed listed, I send for it. I sow it in well-drained pans of peatmoss, soil, and sand, in May or June, when the weather is turning warm. The seed is fairly large, but should be sowed on the surface and lightly covered with peatmoss; it does not germinate quickly, it requires six weeks more or less; then a

little round corm appears, followed somewhat later by the first leaf. The corm likes to be above ground, and the soil should be moist, but not soaking. There is very little trouble, practically every seed will grow, though slowly. The little plants could stay in their pans a year, however I usually put them in individual pots sometime during the winter slack season, using much leafmould, less soil, a little sand, and bone-meal; the third summer they bloom, and the season is from May to November. When grown under glass there are few or no leaves at blooming time, but all winter the foliage is lovely. In the wild, the blooming season is August and September, and flowers and leaves are carried at the same time.

I know that species cyclamen are hardy in southern Massachusetts, but I have never had the courage to put mine out; I grow them in pots and long window boxes on the north side of a cool greenhouse. I don't believe they mind cold, but I think they are fussy about drainage, and just the right amount of moisture, sun, and shade. In Gascony they are hearty and abundant where found, but very local; there they grow in almost pure leaf-mould over limestone, never in complete shade or full sun, and where there is a good supply of underground moisture; the summers are warm and dry, the winters cool and wet. They multiply greatly, always from seed, therefore they grow close to the surface. In cold climates they have to be planted deeper, which complicates the drainage problem. Eventually the corms grow to tremendous size, and one of them will produce up to one hundred flow-



From a drawing by Emily Winthrop Miles

ers in the course of a season. They appear long-lived, I have lost two or three from over-watering in summer, two or three from galls; there is a bit of trouble with *Aphis* spring and autumn—the same brownish-yellow horrors that relish lilies—that is all. Of course from time to time they have to be shifted to larger pots. They have no objection to acid soil.

All this refers to *Cyclamen europeum* and *Cyclamen neapolitanum*. These two are very similar, *europeum* being a little better in leaf and flower; both come in white and shades ranging from nearly pink to nearly lilac. They are said to cross freely, so some careful seedsmen will not state which variety they are supplying. Probably there are also local variations. All are good. *Europeum* is the one which grows in

Gascony; *Neapolitanum* I have never seen growing wild.

There are other cyclamen species about which I would like to know more. Once I bought a package of mixed seeds—it was not very good, but one *Cyclamen coum* appeared, and five or six other things that looked to me like antiquated florists' plants, but may have been true species for aught I know.

This solitary *Coum* is satisfactory, a winter-bloomer with small royal purple flowers on long stems, round leathery leaves, red below and uniform dark green above, retained virtually the year round. I bought three plants more; they were expensive, small, and came from far away; only one survived the journey; the leaves are mottled, and the only flower to appear so far is much

paler than those of my seedling. I have never seen seeds offered. Last year I allowed my young plant to produce one capsule, and arrived on the scene just in time to see a songsparrow gobble it up. I am trying again this year.

The unknown quantities have typical florists' foliage, the whole plant is small and chunky, the flowers much larger

than the other species, frilled and laciniated, very pretty and are winter-blooming. Last year they produced no seed, nor did the plants come through the summer any too well.

I offer my usual plea for information and advice.

ALIDA LIVINGSTONE,
Oyster Bay, N. Y.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

The soil reaction preference of Rhododendron roseum

Reference to the soil regarded as suitable for the cultivation of the Fragrant Pinxter-bloom, *Rhododendron roseum*, in two recent works suggests the desirability of placing on record some observations made over 20 years ago, while the writer was collaborating with Dr. Frederick V. Coville in his studies of the cultivation of acid-soil plants. In Dr. Van Dersal's "Ornamental American Shrubs" we read (p. 83) that "It tolerates a rather wide range of soils." Mr. Graves, in "Trees, Shrubs, and Vines," page 165, gives as one of its merits its "indifference to soil requirements." These statements trace back to a statement which appeared in the Arnold Arboretum Bulletin of Popular Information many years ago, to the effect that this species, unlike other Azaleas, will grow in limy soil.

When this publication came to the attention of Dr. Coville, he called me to his office, and asked if I could look into the matter, since his acquaintance with *Rhododendron roseum*, which dated from his boyhood days, had led him to believe that it was one of the

most acid-preferring of all the native species.

First, inquiry was made of Professor Sargent as to the source of the data on which the published statement was based, and he referred me to John Dunbar, then in charge of the horticultural work of the Rochester, New York, park system. On May 1, 1924, I paid a visit to Mr. Dunbar, and he kindly drove me out to a locality of the azalea on a hill to the northeast of the village of Leroy. The name of the nearby railroad station was Limerock, and there could be no doubt of the presence of lime, for one of the largest quarries in New York state was actively cutting away the hill. The bright pink bloom of *Rhododendron roseum* in the open woods above the quarry could be seen from afar, so up we climbed.

Tests of the soil-reaction of the humus soil shaken from the roots of the shrub, made with the then newly developed indicator dyes, soon showed, however, that the situation was not what it had seemed: all the shallower roots were penetrating material of mediacid reaction ("pH" 4.5) and only a few of the roots which extended downward reached a layer showing any neutralizing effect of the underlying

*Robert Taylor*

[See page 288]

Rhododendron tephropeplum

limestone rock. The rock fragments at the surface were indeed not limy at all, but consisted of chert and other siliceous rocks which have no effect on soil reaction. *Rhododendron roseum*

here as elsewhere had occupied an acid area, and must still be classed as an acid-soil plant.

The way in which misunderstandings, once they appear in print, get

faithfully copied by one compiler after another is familiar to all scientists. The true facts in the case rarely if ever catch up, and the writer does not entertain any hope of success in the present instance. Since, however, this column is read by numerous horticulturists, it has seemed worth while to call attention to the conclusion: So far as soil acidity is concerned, *Rhododendron roseum* should be treated like any other native Azalea.

E. T. WHERRY,
University of Pennsylvania.

Rhododendron tephropoplum

This spring in the continuous and apparently hopeless task of trying to learn more and more, the editor (of the Magazine, not this Section) bought some species of rhododendrons from the Pacific Northwest. Although they were small Mr. English was good enough to send a plant of this species which had a fat flower bud! All were potted and put into the cold pit with the Indian azaleas which represent the main devotion here among the tender sorts. In due course and in spite of its journey, the flower bud developed and the resulting group was recorded by carrying the whole plant to the studio for its portrait. Such a recording has absolutely no value other than that it may give to others as it does to me, a permanent record of the appearance of this particular young plant, for the details are sharp enough so that one may study practically all of the gross details.

One can consult books, for lack of first hand information, and there he will find the species assigned to the Boothii Series with notes that suggest that it may not be too easy to handle. Quoting from Bowers (p. 244) one finds it a "charming small bush, growing on limestone cliffs, blooming abundantly after it becomes a foot or so tall." Its flowers are said to be "vivid

magenta rose with crimson purple tube." Those of this plant were much lovelier with a rather fine clear pink faintly on the lavender side. In our cool early March weather, they lasted remarkably well and caused no end of talk. Since all our Spring has been slow and cool and for us, remarkably rainy in the last weeks, the plant has continued to flourish in spite of its pot but the test may come in late summer when nothing here will remind it of the reported 14,000 feet altitude in its traditional home. Then perhaps it may languish as many another Chinese or Tibetan species has languished or it may flout traditions and produce more buds for another spring, perhaps happier in that no railroad journey will intervene.

It is to be hoped that some one of the members from the Northwest where all these rhododendrons are truly "at home" will correct these notes and tell how well the plant does with them, not leaving it to the poor Easterner to do the best he may.

Takoma Park, Md.

The Glandular Azalea (See page 289)

This common or English name has a strangely pathologic sound, but it is far more fitting than many and if you are captious enough not to believe it look at the stems and calyces of the uppermost flowers in the illustration and see the little insects that have been trapped on the glandular hairs that cover these parts of the flowers.

In July 1938, page 208, the magazine published a picture of what we thought at that time was typical of this azalea in its first described form with the split corolla lobes and the narrow foliage, but we have since seen the true plant and realize that that illustration was not correct for the species, which has very narrowly linear leaves and a less well developed corolla. The present illustration of the form more common-



Robert Taylor

[See page 288]

Rhododendron linearifolium macrosepalum

ly found in the wild in Japan, has to be known as *Rhododendron linearifolium macrosepalum* and while the leaves are far from linear, the sepals in this case are very long. Indeed there

is one stage as the inflorescence develops when one wonders if any sort of corolla is going to emerge from the long green and very sticky calyx.

The azalea is a rather nice thing al-

though it has been in the garden too short a time to give any indication of its ultimate intentions as to height or spread. The plants all raised from seed have been more or less straggling in habit without the dense twiggy nature that we have come to associate with an azalea bush. Here it is practically deciduous not keeping very many of the "winter leaves" that usually protect the flower buds for the coming spring. A few of them can be seen below the inflorescence and to the left of the picture are some of the type of leaves that develop with shoot growth in the spring. The flowers were in full bloom the first week in May which is definitely mid-season for these parts. The color is a lavender tinted pink, which carries in the garden scene as one of the varieties that have to be classed as

lavender. Certainly to preserve its best beauty it must be far from any of the strong salmons or reds. The dots that make up the patch on the upper lobes are dull crimson and have the same clarity of design that one finds in the Korean azalea, *poukhanense*. Other than this there is no resemblance between the two for this plant has a rather better color.

According to Rehder and Wilson (Monograph of Azaleas) there are many forms in Japan, some named. None of these are known to the writer save one called Usuyo, which if true to name is a plant that does not suggest this species but rather some garden hybrid. It flowers earlier and has a rather different color and shape. It will be described and figured in some later issue. Takoma Park, Md.

Narcissus Notes

B. Y. MORRISON, *Editor*

Narcissus, Grand Monarque.

It seems as if tender *Narcissus* should flourish as well under pot culture as many other tender bulbs yet one seldom sees any reference to the practice at least in this country. Great numbers of Paper White and a few others are forced, by amateurs, largely in water to be thrown out after blooming as of no further value.

We find the scent of Paper Whites over strong, so we never grow them for ourselves but last year I grew a dish of Paper White and a pot of Grand Monarque for a blind neighbor who has to satisfy her love of flowers through their scent since she cannot see them. The Grand Monarque looked so healthy and vigorous after blooming that I suggested that I take

them and experiment with them. I knew that the lovely triandrus-azetta hybrid, Silver Chimes would bloom for at least several years in a pot.

All the experimenting amounted to was to water the bulbs occasionally until the foliage ripened and then again when they started growth in late fall. The bulbs were not even repotted though I did intend to give them fresh soil. They were grown very cool and developed slowly but have just finished blooming (March), fully as freely as last year and the plants seemed just as vigorous. I take it that the cool conditions and allowing them to develop naturally with no attempt at forcing is the secret of their vigor.

Grand Monarque seems to us much preferable to Paper White. The flow-



Robert Taylor

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Narcissus, Moonshine

ers are of better shape and substance and to us the scent is more agreeable. The individual flowers are round and shapely, about one and a quarter inches in diameter. The small neat cup is about three-eighths inch in width and a little less in depth, and is brightened by the orange anthers. The flowers are creamy white, the cup somewhat deeper in tint, but before they fade they are nearly pure white. There are ten or twelve flowers in a cluster, the stalks reaching about sixteen inches in height, and the foliage is tall and strong.

In his Handbook of Narcissus, E. A. Bowles says that Grand Monarque "has the largest and best-formed flowers of the citron-cupped" tazettas. He says also that it is the only one of these that he has found satisfactory for growing in the open, but that is in Old England, not New England.

RACHEL CAUGHEY,
Antrim, N. H.

Tulsa Daffodil Show

Tulsa, Oklahoma's, first daffodil display was staged as a "one-man" show by Miss Eleanor Hill on March 24, 1946. As the climate of Oklahoma is particularly suited to daffodils this show was staged in the effort to interest people in something better than King Alfred which does not do well in this climate.

The early yellows trumpets had been stored which accounts of the large number exhibited. White trumpets were new to many visitors and very popular with them. All the red cups attracted attention as did Tunis, Loveneest, Rosabella, Sublime, Coverack Perfection, St. Egwin, Orange Queen and *juncifolius*.

Ten arrangements were displayed.

Six hundred and fifty-two visitors viewed the show in three and one-half hours on Sunday afternoon.

The following varieties were shown: *Yellow trumpets*, Bulwark, Diotima, Forerunner, Elgin, Golden Harvest, Sorley Boy, Kandahar, Lord Wellington, Moongold, Principal, Robert Sydenham, Royalist, Statendam, Winter Gold; *White trumpets*, Beersheba, Cantatrice, Eskimo, Mrs. E. H. Krelage, *moschatus*, Rosabella, Roxane; *Bicolor trumpets*, Ebective, Immense, Jack Spratt, Lovenest; *Yellow perianth Incomparabilis*, Bokhara, Carlton, Co-carde, Copper Bowl, Crowned Beauty, Dunkeld, Fortune, Fortune X Torrid (Guy Wilson), Garibaldi, Havelock, Helios, Jubilant, Killigrew, Merkara, Odessa, Rustom Pasha, Saint Egwin, Sonja, Truan, Whiteley Gem; *White perianth Incomparabilis*, Bodilly, Coverack Perfection, Carmencita, Francis Drake, Galopin, Hades, Irene Bordoni, Milford Haven, Mistinguett, Monique, Polindra; *Yellow perianth Barrii*, Alcida, Market Merry, Treskerby; *White perianth Barrii*, Forfar, Calcutta, Galata; *Giant Leedsii*, Carnlough, Brunswick, Daisy Shaffer, Mitylene, Pinkeen, Pink Lustre, Silver Wedding, Still Waters, Sublime, Truth, Tunis; *Small crown Leedsii*, Fairy Circle, Mrs. Nette O'Melveny, White Lady; *Triandrus hybrids*, Moonshine, Thalia; *Cyclamineus hybrids*, Beryl, March Sunshine, Mite; *Jonquil hybrids*, Gen. Pershing, Golden Goblet, Lady Hillingdon, Ianarth, Lintie, Orange Queen, Tullus Hostilius, White Wedgewood; *Poetaz*, Glorious, La Argentina, Scarlet Gem; *Porticus*, Actea; *Double*, Twink; *Species and miscellaneous*, *Bulbicodium, caniculus, cyclamineus, gracillis* var. *tenuoir, juncifolius* and *jonquilla simplex*.

In addition there were displayed snowflakes, Lenten and Christmas roses, *Tulipa Clusiana*, *T. oculis-solis*, Heavenly Blue muscari and *Tritelia uniflora*.

From the newspaper reports it would

*Robert Taylor*

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Narcissus, Fairy Circle

appear that our Regional Vice President, Miss Hill, staged a show that was not only a credit to her excellent gardening but which opened new vistas of

garden possibilities to the throngs that attended.

This is an example of the type of show that might well be staged as a

first show in any community, leaving all the difficulties of setting up a competitive show until all the members of the club are entirely familiar with the material. Even after competition is in order, a show that will review for the visitor all the range of the family is well worth while as has been shown repeatedly in the shows of the Garden Club of Virginia.

Notes from Alabama

Since you asked me to observe my daffodils this spring and give you the names of my favorites I shall do so. In the first place I have too many!

From childhood I have loved *biflorus*. I love its fragrance. It is the last of the Narcissus Family to bloom in my garden, and I have it in two forms, one with prim precise placement of the perianth segments and another later, with ruffled segments. Hera is another favorite; Mystic with its cup edged with a thin line of such deep dull orange that it seems almost brown; Glorious and Fleur are also favorites in the clustered types and Lady Hillingdon in the yellows. Tunis is one of my favorites, not only because it is beautiful but because it shows well in the garden.

Another prime favorite is Dick Wellband. The contrast between its white perianth and the orange red of its beautifully ruffled cup is startling. I like Red Cross because it is late and helps to prolong the season.

Above all I believe I love the whites. White Nile because it comes early, Lovenest because it is so beautiful and long lasting. Eve and Kantara make such nice clumps in the garden that I have to give them a special place in my affection. I was intrigued by Mrs. Backhouse, new in my garden this year. It is a lovely thing but as it aged the cup became deeper in color until it was a deep rose with a hint of

purple in its composition extending the full length of the cup. I wondered if it became deeper in other gardens.

Among the deep yellows I believe my favorite is Golden Harvest, new to me this year. King Alfred is the general favorite in Birmingham. I like Diotima and Ben Hur also although they have not behaved so well in my garden.

Usually I do not care for double flowers as much as singles but I do like Cheerfulness and the little double Poeticus, *Albus plena odorata* which as Ma Perkins would say is "too sweet for words."

I am always thrilled at the ethereal beauty of Thalia with its little heads bowed like nuns at prayer and I know that I could love *triandrus albus* if it would just bloom for me. I couldn't think of leaving out *jonquilla simplex* the most fragrant of Narcissus. Indeed I may as well admit that I love them all.

MRS. JOHN THOMAS HACKNEY,
Birmingham, Ala.

Mrs. Hackney also sent the schedule and awards from the Birmingham Show, of which we hope to have a note in the Daffodil Yearbook when that is possible.

From Texas

Four years ago I bought six bulbs of the daffodil called "Lovenest." As a general rule the large-flowering daffodils do not grow consistently in this section of Texas. The warm winters do not give the bulbs enough rest and they split up. In spite of this Lovenest has bloomed every year and kept to very good size. I took up the bulbs last year and found that I had eleven where there had been six. Ten of these are in bud and bloom at the time of this writing. (March 1.) Not having had the opportunity of seeing daffodils in bloom in other parts of the



Robert Taylor

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Narcissus, Scraglio



country I do not know whether this is anything to boast about but I do know that it is an exception for San Antonio territory.

MRS. PAUL A. KANE,
San Antonio, Texas.

Report on Narcissus from Arkansas

Although we are several hundred miles from ocean water and the *Narcissus* is said to do its best in a water bound environment, I am about to decide that it would be difficult to find a place where the genus does better than it does here.

Perhaps we are water bound after all. We are surrounded by goodly creeks and water is not far down from the ground surface and generally plenty of it over head; therefore we are "bound" to have enough for most any plant. We have a long, cool, wet spring, with enough moisture in early summer to mature a fine growth of foliage.

Bulbs, if properly handled come

through the summer, hard and healthy, and about our only trouble is noted where drainage is very poor.

Having noted years ago how the different species lived and thrived and bloomed and multiplied under neglect and abuse, I decided that it would be well to investigate the family and see what might be done.

Result—joy and amazement at what had been done and continued pleasure as each new type was introduced into our gardens, taking up their residence quietly and without fuss, and with few demands on the time of the gardener.

Every type has now been tried and all seem happy in their environment—thriving and multiplying normally.

The bicolor Trumpets are least hardy of the lot. At least we have had nearly all of the small amount of trouble we have experienced, with them, and we understand that is common experience of all.

The tender members of the clan do quite well here outdoors in a protected place and hardly ever get completely killed down, but unprotected, Paper White and Soleil d'Or sometimes get cut to the ground by a mid-winter freeze that catches them in bloom.

Once had a nice planting of Soleil d'Or that I had grown from a thousand bulbs in a protected place. Made the mistake of planting them, 8,000 strong, on a terrace in the open field. In full bloom at Christmas, they were cut to the ground by Old Man Winter, who took a second swing at them in February and practically destroyed the lot. I managed to save about my original thousand.

I am perhaps most deeply intrigued by the Poetaz, but shamelessly admit a fascination for the Big Trumpets, yellow, white and bicolors. Although I grow a great many thousands of bulbs, my collection is quite limited,



Robert Taylor

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Silver jonquil, Narcissus gracilis

having only a few specimens of each type, which condition I hope to remedy as soon as markets loosen up somewhat.

JOSEPH B. YOUMANS,
Emmet, Arkansas.

From the Editor's Garden

The war years have brought the usual change of program that such times bring and no new varieties have been had for some years. It seems not amiss however, to make a note of some of the varieties that have done well through it all. The notes that follow are not a report in any sense of the word but rather notes to accompany the pictures in the section, which were gotten with others in the hope that we can have a new Daffodil Yearbook to which all members are invited to contribute their experiences, even if they have not yet had a personal letter to that effect.

Only four sorts have been chosen for illustration and they were chosen not because they were the "one and only" of their respective types but rather because they are of types not often met in shows and well worth growing in the garden.

As a more or less regular attendant at shows it has seemed curious that many of the sections are represented year after year by the same varieties even when others are available with a little searching. One wearies of seeing for example, only dozens of *Thalia* in the triandrus section. *Thalia* is a very nice narcissus and when not too well fed so that the flower head is crowded with blooms that almost jostle one another is a very graceful flower. When it is too well grown, the large number of flowers get in each other's way and so destroy the nodding grace that should be the chief characteristic of any triandrus. Moonshine, the va-

riety shown here is not new. In my garden it rarely gives more than two flowers to the stem and they come into bloom together so that one does not have the stepped appearance that shows in the larger heads. It is tough and easy, but like all the triandrus prefers a well drained warm place rather than a cooler moister one as I have learned to my sorrow with *Niveth* an even lovelier variety which was moved too far down my garden hill where it has promptly languished.

Fairy Circle is a nice variety on the line that separates the poets from the small Leedsii varieties. As the picture shows it is essentially like a poet but the cup is white with a faint hint of green in the tube and a thin line of pinkish orange on the margin.

Seraglio is an old Barrii but one seldom meets it. It flowers as many Barrii do in midseason and so does not always make the shows. When fully matured, the flowers have a white perianth which is tinted in the earlier stages with green and yellow near the cup. So don't cut young blooms to show or some cantankerous judge will score it down. The great beauty of the flower lies in its symmetry.

The last of the quartette is the old species or perhaps hybrid, which is known as the silver jonquil and is more likely to be had from one's friends than from catalogues, *Narcissus gracilis*. This is one of the very last to bloom, the picture being taken on April 30. The color is a very pale citron yellow that turns almost silvery as the flowers age. The great charm is in the scent which is unlike that of *N. jonquilla* but just as strong and just as delightful.

All the photographs have been taken natural size and from garden grown plants that were not grown specially for exhibition, but rather for garden pleasure.

Lily Notes

G. L. SLATE, *Editor*

Some Random Lily Notes

Ralph Warner's success with *Lilium japonicum* is striking and his article on the culture of this "capricious" lily agrees perfectly with all that Wilson has to say of the same lily in its native habitat. However, our experience with this lily indicates that it grows as well in a lean dry soil that is highly acid as it does in the moist location generally recommended. Consequently, it would seem probable that this lily is much more adaptable than is generally supposed. Mosaic, to which it is highly susceptible, has unquestionably accounted for the loss of thousands of plants in the past. Too, the fragile bulbs do not travel well, are easily injured and become infected with the various bulb-rots much more quickly than do most lilies. Any apparently sound bulb may have on it minor abrasions and spores of one or more fungi acquired from rotting bulbs that were travelling in the same case. On this account, disinfection with Spergon, Arasan or formalin is a wise precaution before planting. No disinfectant that contains mercury should ever be used on lily bulbs. This qualification includes several of the best-known and most commonly-used disinfectants.

Speaking of dry, humus-hungry soils, it has been our experience that a number of lilies are not nearly so hardy in this type of soil as they are in a soil that contains a great deal of humus and, consequently, a much higher moisture content. The arid soil conditions do not permit the bulbs to readily make their necessary physical adjustment to severe weather and weather changes. Some lilies, particularly young bulbs, cannot take the

severe winters of central Vermont under any circumstances in a lean soil, but are winter-hardy in soils that have ample amounts of humus. Other lilies, generally reliable any place on our grounds, have not survived one or two severe winters in poor soil while in soil rich in humus have come through our bitterest weather. In our climate a mulch does not appear to affect the situation one way or the other; we use mulches to keep bulbs dormant in spring—not to protect them in winter.

L. speciosum var punctatum

In the 1935 Royal Horticultural Society's Lily Year-Book the late Dr. Fred Stoker classifies this lily as *L. speciosum f. punctatum*. It seems sufficiently distinct to us to deserve a much higher rank than that of form. The lily we know today as "punctatum" may conceivably not be identical with the lily originally described under that name; but it is the lily generally accepted by specialists in England, Japan and this country as "*punctatum*."

Our bulbs were collected in the wild. We do not know where. They were free of mosaic so far as we have been able to determine and, when they flowered, we found that a few bulbs of *L. tigrinum* and *Maximowiczii* had also been collected along with the lot. This in itself is significant for, though the color is not consistent, the ordinary bulb of *L. speciosum* is a dull reddish brown while both of the other lilies have bulbs that are nearly white. All bulbs of "*punctatum*" that we have seen have been much paler in color than those of the type. They also tend to be smaller and somewhat more conical

in shape and we have never seen one that was split or caespitose.*

The plant of "punctatum" is generally taller than the type and the stem does not have the precise rigidity of the other varieties of *L. speciosum*, rather it is a graceful, slightly arching stem. Though there is an occasional variation, the leaves are definitely arranged in two ranks, one on each side of the stem, from top to bottom. They flower from two to three weeks earlier than the type. Most colored forms of *L. speciosum* do not flower with us until September 1st and the white forms are later still. "*Punctatum*" has always been in good flower by the end of the first week of August. The blooms are of more delicate color than most, generally a pure white flushed slightly with pink and spotted a soft rose. Only one plant showed deeper markings for us.

The early-flowering habit makes it a valuable lily for northern gardens where the late-flowering forms are apt to be nipped off by frost or, where at best, they flower so late that the new bulbs scarcely have time to make size and mature before cold weather sets in. In other gardens it extends the flower-season of one of the most popular groups of lilies by several weeks.

ALAN AND ESTHER MACNEIL.

From Washington State

I find we have overlooked mailing in our dues for this year so far, which I now enclose, hoping that we have not missed receiving any of the material. It is always interesting to get your reprints and hear of other folks' experience with lilies. In your letter of February 16, you ask for correspondence, so I will jot down a few notes of our limited experience. I do not know

whether there are other correspondents living near us or not, but if not, perhaps you may be interested in hearing from the Olympic peninsula none the less.

The last issue of the U. of W. Arboretum Bulletin has a most interesting article by E. P. Breakey, entomologist at the Puyallup Experimental Station. We are always glad to find such material, since most of the printed literature seems to concern the East and New England, where snow blankets the ground and the summers, once started, come on quickly and definitely, whereas we have very indefinite seasons and almost never any snow—balmy days all year round and long periods of damp, clammy coldness. We are on Puget Sound, on a steep, clay hillside, facing East, with much cold fog and rain in the fall and winter, and a sharp North wind in the summer. There is considerable shade from tall firs.

We plant everything in terraces, because of the slope and the thin soil, which washes badly. We use much coarse peat moss, bonemeal and all the compost we can make. Even at that the soil is sticky. We do not water except to irrigate once or twice if the summer is too dry. Tests show insufficient phosphorus and potash (which is difficult to obtain now) and a slightly acid condition which seems to suit rhododendrons, azaleas, primroses and most of the spring bulbs and perennials such as lupines, columbines, oriental poppies, etc. We must use lime to grow most of the vegetables.

With lilies, so far, our best results are with the so-called "easy Sunset lily," *pardalinum giganteum*. Of ten original bulbs planted in 1940 we now have hundreds, all of which bloom robustly on four to six foot stems. They have no pests except for the numerous slugs which chew the initial spring growth, if there is any damp growth

*The caespitose character of many bulbs is frequently associated with severe mosaic infection. It can also occur from too close cutting, especially among the Martagon-shaped lilies.

of chickweed or bunch grass to encourage them. The plants lean out to the sun, so must be staked to prevent wind damage and poor appearance. Their shiny red petals are very spectacular against the evergreens and the whorled foliage is interesting. A flat of loose scales (removed in replanting), set in peat moss, in a dark corner of the greenhouse in November, showed many tiny bulbs in January when it was brought into the light, and now in March there are four-inch green leaves showing.

The smaller *pardalinums* are equally healthy, but not so prolific or so striking.

The Regals are nice, but we are not satisfied that we grow them properly, since bulbs from many different sources all grow only moderately well. Perhaps they need lime. Flats of seed all germinate freely with bottom heat, but after being put out-of-doors, the seedlings vanish. The same is true of *tenuifolium*, which is supposed to be so easy. We have never gotten them to bloom. We love *cernuum* with its dainty blooms, but gluttonous slugs finally ate out the sprouts (on their way to the slug bait) and the bulbs disappeared. We are awaiting the appearance of newly purchased bulbs from the ground and will try to control the slugs this time.

The *candidum* are huge, healthy bulbs, but due to the cold, damp spring, the foliage never fails to blight, despite spraying. We have not tried cutting off the old leaves in spring as is advised. Neighbors on higher ground grow beautiful *candidum*, no doubt partially because their soil is less acid. Also they are farther from the water.

One bulb of *L. Humboldtii* is a dependable bloomer and has grown larger and more handsome despite two moves. Inspection this week showed a fat, red bud, two inches out of the ground. We

have kept crossed seeds from it several times, but cannot seem to make them germinate. Do we get too impatient?

Several huge dumps of supposed *umbellatum* were transplanted from a friend's garden in full bloom because her grounds were needed for another purpose. The clump stood the shock with ease. Set carefully with peat and bone meal and watered with Transplantone they continued to bloom brilliantly for several weeks against a background of dark green evergreen huckleberry, and did not wilt at all.

We enjoyed *L. Hansoni*, which bloomed readily and seemed to have no pests, but the flowers faded so badly we moved our bed and the bulbs did not survive.

L. Willmottiac certainly has a "wandering stem." Ours wandered into the path of the shovel so that we damaged the bulbs and lost them. The scales did not form bulblets, but we did not have bottom heat at that time.

We have grown *tigrinum* but have lost it, no doubt it wants a sandier soil. We do not like the *Fl. Pl.* variety at all—too distorted. Our *speciosum* bloom but do not seem too happy. *Henryi* does very well, but is not so spectacular as we expected. We have tried to grow *canadense*, but will have to haul more sand, evidently, before we can hope to keep it from winter rot.

Spring clean-up is a difficult job if left until the late lilies are well out of the ground. By June the chickweed, blackberries and fringe-cup are rampant, and it is impossible to control all the slugs they house in their damp foliage. So we go cautiously over the beds as soon as the weed cover starts to thicken, scratching in bonemeal and trying to avoid damaging the new shoots. With the next weeding, we usually leave a mulch of coarse peat-moss to keep the ground from crusting and to discourage weeds.

Bulbs of *longiflorum* bought from a supposedly reliable source were a disappointment. We had hoped to force them in the greenhouse, but they appeared to be infected with rot and were discarded. Perhaps we did not have enough air circulation in our small house.

This year we are looking forward to blooms from *centifolium*, *testaceum*, Brenda Watts, Shukson, Edna Kean, Maxwell, *formosana*, *elegans* Alice Wilson, and the two woodland lilies, *giganteum*, and *cordifolium*. And if the Sunsets we reset last fall all bloom, we shall have more than we know what to do with.

After this year we should know whether it is possible for us to grow the varieties named well enough to justify the effort of maintaining the grounds. Otherwise we will use the space for primroses and other perennials we are sure of growing well.

You ask about companion planting. We use some columbine and thalictrum, but mostly primroses and ajuga which can be moved at will and set in full bloom after the beds are weeded, to provide a spot of color where otherwise the terrace would be naked until June or so. After blooming, the primroses are divided and reset elsewhere, and the ajuga is ruthlessly torn out, less it degenerate to a weedy tangle with its generous runners.

We hope to try still more lilies, to satisfy our unending curiosity, among others: *japonicum*, *superbum* Norman Henry, *chalconicum*, and the improved *candidum*. We have no hope of ever being content with what we have!

Reading this over, we are a little discouraged at our lack of noticeable successes, but we have certainly learned to love our plants and are spurred on to more understanding of them.

MRS. E. A. NIEMEIER,
Squamish, Wash.

Lilies in Minnesota, as a hobby

Replying to your request for "how and why I grow lilies" will say that some 15 years ago, while driving through Northern Wisconsin, I saw in a farmer's yard a group of lilies (I have since learned that they were *umbellatum erectum*). I stopped and bought a bulb or two. I now have about 30 kinds that bloom each year. I lose a few each winter, and try out a few new ones each year.

I always try to raise as many as possible from seed. The Regals were among the first from seed, and I got stalks that had as many as 20 flowers to a stem. Some of the Regals will bloom in two years, time from seed planted in the open ground, in the spring. I have from 200 to 300 stems of the Regals. Of some of the rare kinds I have only one. Others that will grow readily from seed are, *tenuifolium*, *amabile*, *cernuum*, Crow Hybrids, *Henryi* and all the Sienographer lilies (the latter of course will not come true).

The following, as well as the above, all do well here. *Hansonii*, Fire King, T. A. Havermeyer, Geo. C. Creelman, *Browni*, *superbum*, *Davidi*, *speciosum rubrum* and Sunset.

Among the failures, *auratum* will usually blossom the first season. I have had as high as 8 blooms on a stem, of this kind, but the second season they are either poor or missing. I have had the Madonna very fine for a summer or two, but as it is liable to be diseased I am not trying it now. The *canadense* last only for a season or two. The *centifolium* bulbs do not survive our winters. The *pomponium* blossom but soon disappear. The White Martagon did well for a while, and is a handsome little lily, but does not last. The *philadelphicum* lasts only for a summer.

I am trying new for this year, *Monadelphum*, *Grayi*, and *Shuksan*, and hope to make a success of them.

Edna Kean, one of the stenographer lilies I like very much. A nice dark red, well shaped flower head and strong growth. I also have some seedlings from one of this group (Grace Marshall I believe) that are fine. A straw color, and a perfect arrangement of the flowers.

I have no particular way of arranging the lilies, except that when I have enough bulbs of say, *Regals*, I like to make a solid bed of them. Otherwise I like to see them in clumps or groups, with other flowers.

A T. A. Havermeyer seedling last summer was six to seven feet high, with some 12 blossoms. It is a fine lily.

The *speciosum rubrum*, *superbum*, *Regal*, *tennifolium*, Havermeyer, and Edna Kean are our favorites.

I have never had the soil tested, but we are in a limestone region. The garden originally was a foot or so of black prairie soil, overlaid with solid yellow clay. In making over the garden many loads of woods dirt have been added, and the clay so thoroughly mixed with it, that it would qualify as good loamy sweet soil, I am sure. In planting a particularly fancy bulb with a liking for sour soil I give it all woods dirt, with sand under for drainage.

As to the weather we get as low as 20 below, but not often, and at that time the ground is usually covered with snow. In the summer we have plenty of rain, and usually no very hot weather.

EARL H. WATSON,
Northfield, Minn.

Report on Lily Seedlings

The middle of March 1945 I sowed, in gentle heat, the following lilies of the so-called "quick germinating"

group: *amabile luteum*, *cernuum*, *concolor*, *pulchellum*, *Leichtlinii Maximowiczii*, *Sargentiae*, *regale*, $\times$ *Aurelianensis*, $\times$ *Coronation*. All germinated within a month.

At the same time I sowed the following in the "slow germinating" group: *auratum* in various forms, *Cathayanum*, *Martagon* the type, *Martagon album*, *Martagon Cattanae*, *Martagon* $\times$ *Hansonii*, seeds said to be those of *pomponium*, *Szoritsianum*, which I take to be a still more difficult way to say *monadelphum*, and *tsingtauense*. The *auratums*, the *Martagons*, *Szoritsianum*, and *Tsingtauense* germinated through the summer and formed little bulbs, many of the *Martagons* sending up little leaves for good measure. *Cathayanum* and *pomponium* never stirred.

Later in the spring I made a second sowing of the "quick" group. In warm weather they germinated no faster, and developed less well.

This winter the "quick" group was kept in the greenhouse and potted while dormant. Now, in late February, *concolor pulchellum* is very active, and *Leichtlinii Maximowiczii* is sending sprouts from last year's bulbs, while a few seeds which remained dormant are germinating. The others are still quiet.

All of the "slow" group, including the pans with dormant seeds of *Cathayanum* and *pomponium*, were exposed to the cold until early in February; now, two weeks after being brought back into the greenhouse, all are pushing up little green sprouts, and *Cathayanum* and *pomponium* have germinated.

In November 1945 I sowed seeds of *canadensis*, a lovely yellow form collected in Connecticut last summer, *japonicum*, *speciosum erectum*, and *Monadelphum*. All of these are in the "slow" group, but *speciosum erectum*

required less than a month to germinate, briskly set about making bulbs, soon followed by little true leaves. *Monadelphum*, ever erratic, produced one true leaf February 12th.

I always feel foolish when sowing hybrid seeds, for I know the cards are stacked against me, but once I was rewarded with two superb second-generation George Creelmans and so I am hoping a few attractive colors may appear among the Aurelianensis and Coronations. In the case of *Martagon* × *Hansonii*, a reversion to either parent would satisfy me.

I am not clear about the origin of *speciosum erectum*, is it a sport, a cross, natural or otherwise, or a true form? When and if it blooms I should know, but it would be nice to have my curiosity satisfied sooner.

Among my older broods, *monadelphum* is still the most cantankerous, very slow, very uneven at all stages; I refuse to be discouraged and continue to sow seeds whenever I can lay hands on it. The two Americans, *superbum* and *Humboldtii*, are slow and steady. *Auratum* is still the best tempered, to my surprise one *platyphyllum* bloomed its fourth summer, a large, perfect, pale flower. *Cernuum* and *amabile* the type also bloomed last summer, their third. *Cernuum* is dainty and fantastic: like a flower on old Dresden china; *amabile* is well named a pleasant lily. Maxwell was taller and had more flowers; some of the *centifoliums* improved remarkably with age, the whole plant growing taller and more robust, the flowers larger and, unlike those of *regale*, well spaced; this lily behaved better than *regale* or George Creelman in a late May frost, but not so well as *candidum* and *longiflorum praecox*, neither of which suffered at all.

ALIDA LIVINGSTONE,
Oyster Bay, February 1946.

Lilium Henryi

Lilium Henryi is a handsome, reliable and very useful garden lily that should be more generally grown in the average garden. Beginners with lilies who usually start their venture with some of the more beautiful but less easily grown species might better put *L. Henryi* near the top of the list. While *L. Henryi* is not the most beautiful lily, it is never-the-less, a handsome plant well worthy of a prominent place in any garden. Moreover, it is sure to succeed and flowers in August when there is a scarcity of perennial flowers in the garden.

The flowers are nodding, or pendulous, with reflexed segments, orange in color, spotted and with a green line along the center of each segment. They vary from a few to 20 or more depending on the vigor of the plant. The stamens are orange. Frequently two flowers are borne on each pedicel. The flowers bleach badly in the hot sun, hence a shady site is preferred.

L. Henryi is a plant of great vigor the purplish brown stems growing from four to as high as nine feet in a fertile soil and are well clothed with dark green lustrous foliage. Usually the stems are lax and need staking, but if grown among shrubbery no additional support will be necessary. The leaves are scattered, broad, and just below the inflorescence are short, ovate and crowded giving the plant a characteristic appearance and making identification easy. This short crowded foliage at the top of the stem is also characteristic of many of the hybrids of *L. Henryi*. The foliage remains green until late fall.

The bulb is mahogany red in color, round and large, sometimes attaining a diameter of seven or eight inches. The stem roots form a dense mat and several bulblets are borne among them. The bulb is similar to those of the

trumpet lilies with which *L. Henryi* has been hybridized and not like that of *L. speciosum* which the flowers resemble somewhat in form.

Augustine Henry, a British medical officer stationed in Ichang, China discovered this lily in the Ichang gorges of the Yantze river in the mountains of western Hupeh and Kweichow where it grew among herbaceous plants and shrubbery in dense thickets in shade on the limestone cliffs. Herbarium specimens were sent to Kew in 1888 and bulbs a year later. In 1900 E. H. Wilson sent large shipments of bulbs to England and the United States.

The bulbs should be planted 8-10 inches deep. A loamy soil high in fertility and well-drained suits this lily much better than light, sandy or acid soils. On the latter it makes weak growth. It flowers well the first season after planting, but the plants get bigger and more floriferous as they grow older.

Propagation is by seeds which come up in three or four weeks and may flower the third season. If homegrown seeds are to be used the stems should be cut before a hard frost and ripened indoors as the seeds mature rather late in the northern states. Bulblets are borne on the stem bases and may be used for increase. More and larger bulblets will be obtained if the stem is jerked out of the bulb as the last flowers are fading and heeled in until late fall when the bulblets are removed and planted out. Natural division of the bulb provides considerable increase in the garden.

L. Henryi is better suited to a shady situation as the flowers bleach badly in the full sun. It starts growth early and the new shoots are sometimes frosted. Protection is advisable on frosty nights.

Lily diseases are not serious with

L. Henryi. Mosaic may attack it, but does not spread rapidly. Botrytis is bad only in very wet seasons and in sites where air circulation is poor. The leaf tips frequently show Botrytis lesions which are produced by the moisture on the leaves running down to the tips which dry off last, and thus provide favorable conditions for germination of the spores of the fungus. Basal rot is not a problem with this lily.

L. Henryi citrinum

This lovely variety is identical with the type except that the flowers are lemon yellow. It is very beautiful and is well worth growing when bulbs are less expensive. The stem is lax and needs support.

L. Henryi Buttercup

Under this name a bulb was received from Japan which bore flowers intermediate in color between citrinum and the type and much less attractive than the former. It has a stiffer stem.

L. Henryi Upright

Under the name of Upright Henry a bulb was received from the Horsford Nursery a few years ago. The stem is upright, requiring no support and the leaves are larger than with the type. It flowers a few days earlier than the type and is a handsome variety that is very worthwhile. This variety and citrinum do not set seeds when self-pollinated.

HYBRIDS OF LILIAM HENRYI

L. Henryi has been crossed with the four trumpet lilies which have bulbs similar to that of *L. Henryi*. The first cross was with *L. leucanthum chloraster* sometimes known as *L. centifolium* and it was made at Kew in 1897, the plant flowering in 1900. It was

named *L. × Kewense* and was described as like *auratum* in habit, foliage, size and form of flower, but its constitution was poor and the hybrid was lost. The flowers had wide spreading curiously twisted segments with recurving tips which were creamy buff becoming almost white with age.

The description of *L. × Kewense* inspired Monsieur Debras of St. Jean de Braye, near Orleans, France to cross *L. Sargentiae* with *L. Henryi*. The hybrid, which was named *L. Aurelianense*, first flowered in 1928. The plant resembled *L. Henryi* in habit and occasionally produced bulbils. The horizontal or pendulous flowers open widely the segments tending to recurve. The petals are bright orange at the base, becoming creamy white in the upper half and the flowers are fragrant. The plant was said to be self-fertile, a valuable characteristic for the breeder.

L. Aurelianense is available in this country and is being used in producing additional hybrids. Its seedlings are being sold by lily dealers.

T. A. Havermeyer is the third hybrid of this group. It was produced in 1933 by Tom Barry of Lamberts-ville, N. J., who crossed *L. myriophyllum* (*sulphureum*) with *L. Henryi*. The flowers are seven inches in diameter, the perianth segments more or less twisted with recurved tips, ivory yellow in color, suffused with apricot, with a longitudinal band of green on the outside of each segment. It is a handsome and distinct lily growing to a height of seven feet when well established. The shoots come up much later than those of *L. Henryi* and thus escapes spring frosts. The inflorescence is very heavy and the plant must

be staked or the flowers will drag on the ground and the stem may break.

T. A. Havermeyer is a valuable lily for the breeder and many seedlings of it have been raised. Six of these have been named and introduced by Edgar L. Kline of Lake Grove, Oregon. Others will undoubtedly be offered as the breeders continue their efforts with this group.

L. regale has been crossed with *L. Henryi* by a breeder working at Harvard, but the published report of the work is all that the writer knows of the plants and nothing seems to have been introduced as yet.

In this group of plants including *L. Henryi* and its varieties and hybrids we have a valuable group of August flowering lilies, varying considerably in color, form, stature and time of bloom and all of easy culture. These and the future hybrids that will result from interbreeding this group will greatly enrich our gardens.

G. L. S.

1947 Lily Show, Garden Club of Virginia

Word comes from Mrs. Harrison P. Bresche, "Pembroke," Orange, Virginia, that the Lily Committee of the Garden Club of Virginia is now making plans toward a Lily Show in 1947. All members who have questions may write to Mrs. Bresee at the above address.

It is too soon to give all the details of place, time, and schedule, but it is not too early to plan your share in the show for next year.

Words of other shows will be welcomed by the Editor, 821 Washington Loan and Trust Building, Washington 4, D. C.

Cactus and Succulents

W. TAYLOR MARSHALL, *Editor*

Chiapasia Nelsonii Br. and R.

The lover of plants may look at any specimen in his collection in many different ways according to his own nature and interests. It may be the beauty of the flower for which he will cultivate even an unattractive plant patiently throughout the years. It may be the odd structure of the plant which stimulates his imagination. Or the plant as a whole, as a living creature, may be an object of study for him, in addition to his pure enjoyment of color and form. He may want to learn about the habits and modes of life of the plant and about the laws which rule its function and structure.

Chiapasia Nelsonii, the subject of this article, may easily be treated from anyone of these viewpoints and is a subject worthy of discussion in general. The type and only species of the genus *Chiapasia* (from the state of Chiapas in Mexico) which was erected by Britton and Rose in 1923, was introduced into this country rather recently. Yet it is readily obtainable, and although it is a species and not a cultivated hybrid, it adapts itself well even to living-room conditions. It is an attractive plant, more regular in growth than many other *Epiphyllanac* or orchid cacti. Its mature joints are dark green and graceful. At first they grow upright but they are not stiff and tend to hang down when they become taller. The flowers appear easily, in my home early in the year. They are of a distinctive shape and a clear purple-pink color. Usually there are five inner and five outer petals, but the number is not constant as can be seen in the illustration, in which the flower

at left has twelve petals while the one at right has the usual ten. It must be mentioned here, that the low number of petals is the characteristic botanical feature of this species which prompted Britton and Rose to establish a separate genus for it. The numerous stamens are red at the base, white at the top and hang out of the flower by at least half an inch. There are five white stigma lobes. At low room temperature the buds develop in five to six weeks from the time when they can first be recognized in the areoles. This is a short time compared with many orchid cacti. (*Nopalxochia phyllanthoides* is similarly fast, but somewhat smaller in flower). The buds open at nightfall and remain fully open for two days, declining on the third day, so that they are completely wilted after 72 hours. While the flowers are not gorgeous—they are $2\frac{3}{4}$ - $3\frac{1}{2}$ inches long—and have no scent, they possess such fine shape and color and are so easily produced, that any one should find pleasure in this plant.

Another point of interest will be found in the structure of the plant itself. I have referred to the neat and fairly regular growth of the joints. When we study this growth more closely it becomes apparent, why we have the impression of neatness. In contrast to many species of the *Epiphyllanac* which produce their joints in seemingly unpredictable ways and in many diversified forms, *Chiapasia Nelsonii* brings forth its branching joints according to a well defined pattern, the fundamental rule of which is the spiral. When a new shoot sprouts from the base of the plant, it is round in the beginning like a stem, and be-



Fig. 1. Two flowers in their characteristic position at the top of a joint.

haves much like a shoot of a leaf bearing plant, producing from the areoles in regular succession side joints, which will finally be arranged around the round stem in a corkscrew pattern like so many leaves on a stem. The spiral pattern is an almost ubiquitous principle of growth (examples in addition to the arrangements of the branches and leaves in numerous plants, are the patterns of the seed-discs of sunflowers or the structure of pine cones). Many of the massive cacti show the spiral arrangement of the areoles to perfection and it would be a fine scientific task for amateurs to study and measure the many different forms which this principle of structure may take. Those cacti which have flattened joints still show an indication of this pattern in the arrangement of the areoles which are not spaced symmetrically on both sides of the joint but alternate in height, so that it is easy to imagine the spiral, which would result if the flat

paddle shape of the joint were moulded back into a massive round form.

While the spiral pattern of the areoles is therefore still recognizable in the Epiphyllanae, their ways of branching do not usually follow this pattern. In *Zygocactus* and *Schlumbergera* an entirely different principle of symmetrical branching is seen, in which joints of almost equal size are formed. *Epiphyllum oxypetalum* shows side joints coming out of the areoles of completely flattened joints as though leaves were sprouting from leaves. The arrangement of the joints in *Chiapasia Nelsonii* is the most similar to that of leafbearing plants. Fig. 2 attempts to illustrate this in a shoot which is unusually long and thin, because it was intentionally grown at a high temperature with little light. In that way the side joints became spaced farther apart than usual. Under more normal conditions the joints sprout out of the areoles at very small inter-



Fig. 2. *Chiapasia Nelsonii* joints branching from a round central joint at regular intervals in spiral arrangement.

vals, the central joint lengthening very little, so that the impression of a whirl is produced.

The pattern of growth in this species is indeed so different from other Epiphyllanæ that the establishment of a different genus for it appears well justified. In addition, the species is a fine example for the fact that the same structural pattern may appear again and again in the living world, although each time it is executed by different means. The similarity between the ar-

rangement of the joints in our subject and the arrangement of leaves around a stem is striking, yet the joints are not leaves nor are they derived from leaflike structures.

E. C. ROOSEN-RUNGE, M.D.

Astrophytum myriostigma variety
Coahuilensis

To the ardent cactophile a plant in its native habitat is worth two in a garden, especially if the plant in question is his favorite species or if the species is hard to find.

I had read of the difficulties experienced by others in locating specimens of *Astrophytum myriostigma* Lemaire variety *Coahuilensis* Purpus a variety with five ribbed, columnar stems and a large yellow flower with a red center, which grows in most inaccessible districts. Quite by accident I came upon the particular area of its range here described.

While in the city of Torreon, Coahuila, I questioned some of the natives about the cacti found in that vicinity and was told of a small "organo" which grew near Ciudad Lerdo in the mountains nearby and overlooking the Rio Nazas. I was quite skeptical, as I knew of no "organo" type cacti growing in that part of Mexico (The Mexicans use the word "organo" to describe certain columnar, ribbed species of cacti). However, as most Mexicans are nature lovers and very observing, it usually pays to investigate if possible.

A highway from Torreon passes through Lerdo and continues beyond along the river and this road I travelled by car but from the road nothing resembling the described plants could be seen so I left the car and took to the mountain. After a bit of hiking the Mexican with me found a plant which he brought to me and I was happy to recognize it is *Astrophytum myrio-*



*A large plant of *Astrophyllum myriostigma* var. *coahuilensis*. Other plants are *Agave lechuguilla*, *Jatropha* sp., and *Opuntia* sp. Smaller plants are sometimes hard to notice. Plant on the right is in bloom; the plants growing above are *Jatropha* sp.*

stigma var. *Coahuilensis*. I had hoped to find this species but as I did not have time for extensive search feared that I would be unable to see it in its natural surroundings.

I could now understand why the natives had called it "organo" as this species is columnar and heavily ribbed although it does not grow very tall, I believe the largest recorded were two feet high while the average is eighteen inches.

Once I knew what I was looking for the search was easier for it is not unusual after first finding a plant to back track and find that one has passed many specimens without recognition that had just missed being walked on. We found many fine specimens up to eighteen inches tall but as can be seen in the accompanying pictures many of the taller plants, when growing on quite steep terrain, have leaned over and continued growth in a decumbent position.

Nearly all of the plants grew amid heavy stands of *Agave lechuguilla* Torrey and a species of *Jatropha* (possibly *J. spathulata* (Ortega) Muell.) which the natives call "sangre de dragon."

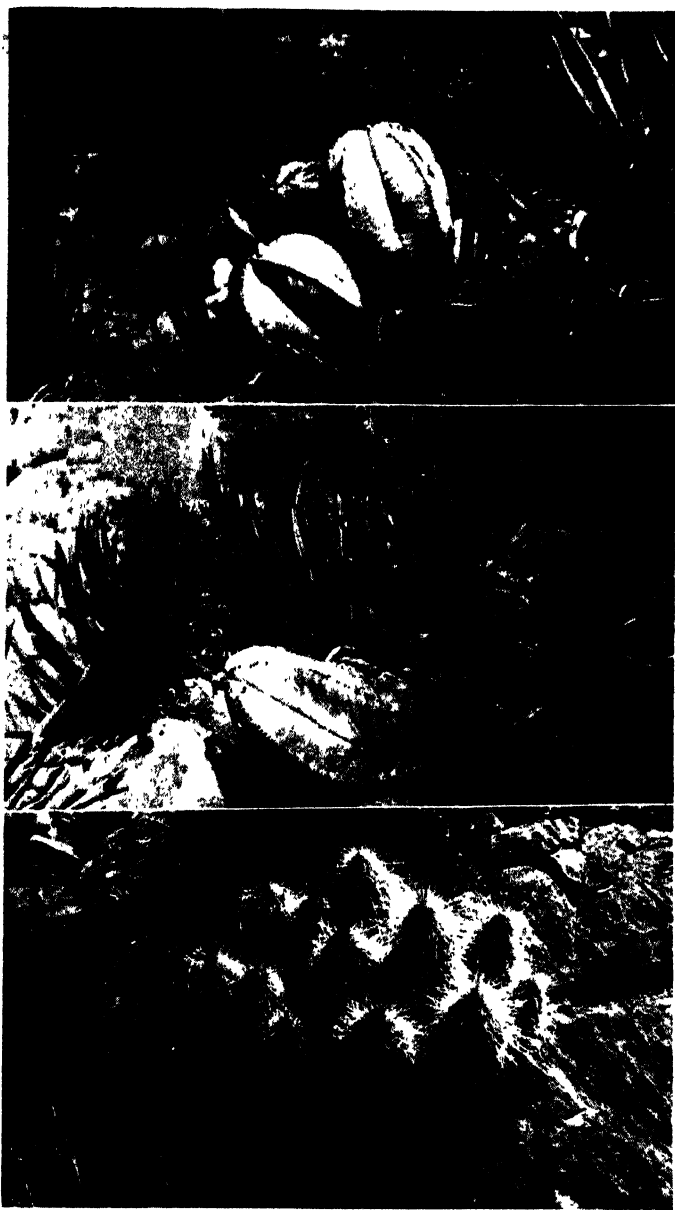
There were a number of other species of small cacti growing in the same terrain but only one other outstanding species and that was an *Echinocereus* with many, very white spines.

I now have a number of these *Astrophytum*s growing here in California and they are treasured reminder of one of the memorable hunts I enjoyed during my stay in Mexico.

ROBERT FLORES.

A Trip into Cactus Country of Cuba and Puerto Rico

Having been an enthusiastic amateur collector of cacti and the other succulents for a couple of years before entering the armed forces, the Navy's



Two perfect specimens growing together. The agave has been removed in order to get a better photograph. Large plant which has continued growing in a reclining position. The white-spined Echinocereus sp. mentioned in the article.

point system didn't hold the immediate interest for me that it did for most Navy men. While my ship was in the Philadelphia Navy Yard being outfitted for active duty in Asiatic waters, I heard rumors of a short stay in Cuba upon leaving the Philadelphia Navy Yard. Even though I had just returned to the States from nearly a year and a half of continuous duty in the English Channel, the prospect of being able to walk among the big *Cereae* of Guantanamo Bay, Cuba, seemed worth two more months of duty before my release.

After a pleasant trip we docked at Guantanamo Bay. From the Navy bus I saw my first big *Cereus* in its natural habitat. I left the bus at the next stop and walked back to the plant I'd seen. It turned out to be *Lemaireocereus hystrix* Haworth. Before leaving the Island, I understood what Britton and Rose had described in "The Cactaceae" as a species which was variable in the length of its spines. Within sight were three types. I found plants with spines nearly four inches long, another plant with very, very short spines and some with spines nearly an inch long; yet all three were *Lemaireocereus hystrix* Haworth.

Large plants of *Pilocereus Robinii* Lemaire and *Pilocereus Brooksianus* Vaupel were numerous. I was impressed with a large eighteen foot branched tree form of *Harrisia criophora* Pfeiffer which had a definite trunk as the big tree types of *Cereus* develop. Two species of *Opuntia* were growing on lower ground, namely *Opuntia macracantha* Grisebach and *Opuntia Dillenii* Ker-Gawler. *Mamillaria prolifera* Miller was found growing under bushes with its long spreading roots just under the ground.

After leaving Guantanamo Bay, Cuba, I had the added pleasure of a four hour stop at Culebra, Puerto Rico,

where I found the large beautiful blue *Pilocereus Rayenii* L. *Opuntia Dillenii* Ker-Gawler was also found growing here along with *Opuntia borinquensis* B.&R. and the reddish bronze *Consolea rubescens* Lemaire. One species of *Furcraea* was found. Here also I saw my first *Tillandsias* growing in their normal state. Very small ones were growing on the *Pilocereus Rayenii* and very large ones of a dull grey greenish color were growing on the trees.

I feel the trip to Cuba and Puerto Rico was more than worth the extra two months I spent in the Navy.

GEORGE G. GLADE.

The Chin Cactus, Gymnocalycium

The chin cacti form a fairly large Genus, about seventy-five species, of South American plants coming from east of the Andes mountains in Brazil, Argentina, Bolivia, Paraguay and Uruguay. The name *Gymnocalycium* is from the Greek, meaning naked bud and Chin cactus is used as a common name because of the more or less conspicuous enlargement of the tubercle just below the areole which is called a "Chin."

This "Chin" seems to be present, to a greater or less degree, in all species of the genus and is an easy point for identification of them.

The flowers come from the center of the plant and are quite large, as a rule, compared to the size of the plant and vary from white through pink, yellow and lavender to red, one species, *G. Venturianum*, Bckbg. has a brilliant red flower about one and one-half inches across.

The "Giant Chin Cactus," (*G. saglionae* Cels.) is the largest growing species and makes a very attractive plant when well grown. I have seen one specimen of Giant Chin which stood well over one foot tall and was all of

ten inches in diameter and when in flower the bloom formed a perfect crown for the plant. The flowers of Giant Chin cactus are a pretty pink.

The striped Chin Cactus (*G. Mi-hanovichii* Fric & Gurke) is possibly the best known of the Chin cacti and can be found in most cactus collection. It is not a large growing plant, seldom becoming more than two inches in diameter and about one and one-half inches tall, the beauty of the plant lies in the distinctive marking which runs from each areole across the body of the plant in a perfect pattern. The color of this plant is usually a dark reddish brown. The flowers of the Striped Chin Cactus are about two inches across and of a yellowish-green color.

Dam's Chin Cactus (*G. Damsii* Schumann) is another fine member of this group, the plant growing to three or four inches in diameter and two or more inches in height, with a body color of a bright fresh green and flowers two inches or more across, pure white.

Spegazzini's Chin Cactus (*G. Spegazzinii* (Br. & R.)) is one of the more heavily spined plants and makes a very pretty plant of about four inches in diameter, with flowers ranging from white to pink.

These plants are very satisfactory for pot cultures, in four or five inch pots, as the plants seldom will outgrow their pot. As a rule they are solitary and do not throw offsets except in rare instances. They are very well satisfied with any good garden soil which contains coarse sand for keeping the soil loose and they appreciate an occasional feeding of cow manure or other good fertilizer.

They enjoy growing in full sun although they do well in part shade but do not flower as readily there as when grown in the sun. During the growing

season the Chin Cactus will take a surprising amount of water with no ill effect if the soil is well drained.

In climates where the winters are mild and temperatures remain steady not going below thirty above 32 degrees the plants will do well out in the open garden, but where the temperatures drop below that point it is well to give them the protection of a glass house or other shelter.

I have found this Genus one of the most satisfactory because the plants are all interesting to look at, they do not require too much special care, they do not take up too much room and above all, they flower readily and bloom continuously during the summer. I would highly recommend this group as a starter to anyone just becoming interested in a Cactus collection. There are a number of species of *Gymnocalycium* readily available from most dealers.

H. G. RUSH.

Culture of the Orchid Cacti

Every commercial dealer has his own pet formula for soil, water and general treatment of the Orchid Cacti but we often find that the formula that is successful for the commercial grower becomes a stumbling block for the beginner. For example, both peat moss and fertilizer have caused the loss of many plants to amateurs although they are both used successfully by the commercial grower who knows just when the manure is well rotted and just how often to water the plants under all conditions; long experience has been his teacher. Most amateurs over-water, the peat moss holds the water making the soil over-acid and the plants rot at the base. Too much or too new manure burns tender roots especially of cuttings just rooting.

Orchid Cacti need extremely loose, well-drained soil. They like moisture

but not saturation, all excess moisture must drain away at once to prevent over-acidity. They grow best in tin, wooden or glazed pottery containers which should stand on two small sticks of wood to leave the drain in the bottom open and the resultant light and air circulation discourages the pill bugs and other pests that otherwise find refuge under the pots. Clay pots dry out quickly and more water must be supplied to plants in such containers. Tin cans should have the drain holes made in the sides of the cans near the base and not in the base itself.

We have made numerous experiments since our first commercial Orchid Cactus show in 1933 and we believe that the best soil contains equal parts of good top-soil, leaf-mold and coarse building gravel with a generous amount of powdered charcoal added. This soil will require the addition of well rotted manure or liquid fertilizer in the second year and yearly thereafter. Occasional blood-meal or bone-meal is beneficial.

Old growth is best for cuttings as the stronger the central woody stem the sturdier will be the resultant plant, a long cutting is stronger and blooms quicker than a short one. All cuttings should dry for one to two weeks according to the thickness. It is best to dry cuttings slowly in a cool, shady place which will result in the formation of a very tough scar-tissue which is rot resistant. Plant cuttings about one and one half inches deep using care to prevent bruising while planting. The strongest roots are formed when cuttings are watered sparingly for the first month.

If rooted cuttings are purchased, it is generally safer to start them in a very dry soil and withhold water for three days and then water sparingly until new growth is observed. This

method prevents rot and starts the plant off to hardy growth.

If it becomes necessary to re-pot be sure that the soil is dry in the pot and remove the plant carefully to prevent bruising, divide it if advisable and plant in pots with dry soil. Replant in the same sized containers for best blooms and withhold water for a week then water sparingly till reestablished.

Orchid cacti need some sunshine, but will produce flowers in shade if there is an abundance of reflected light. They are always a semi-shade plant.

MRS. CACTUS PETE.

Hunting that New Plant

What interesting little plants? Where did you get them? Will we be able to get some of them? These are but a few of the many inquiries about the plants which we obtained while on an expedition into the mountains of northern Mexico that took us through portions of the states of Sonora, Sinaloa and Chihuahua. Much of the area covered in this expedition was practically virgin territory as far as botanical research was concerned and as a result much interesting information was uncovered.

Hunting for plants in the great wide open spaces has many aspects other than just the gathering of a representative group of specimens. When you get a new plant from your dealer, do you ever consider what the explorer experienced to obtain the original specimens? Only rarely can new material be found very near the well-traveled thoroughfares or along the safe well-beaten paths. More often they are discovered only after many weary miles of travel by horseback and additional miles of foot work in scrambling up steep hillsides, over rocky ridges, or down through pathless thickets of thorny brush that literally seems to be



Typical home in the lower brush country

trying to obstruct your passage as though you were a transgressor in their virginal domain.

In the low arid country the merciless sun tries to fry you in your own juice, especially when there is very little available shade and the precious supply of water in your canteen is nearly exhausted, not to say anything about being unpalatably luke warm and also heavy with the unsavory taste of all those dead leaves which were in that last water hole. With the next spring some miles away, and knowing that when it is finally reached your riding and pack animals will have first call on the scant supply, you naturally hoard those few remaining drops just in case there will not be much of it left for you. You may not believe it but you are even grateful for a little of that muddy water that your stock has previously slobbered in. Why so considerate of the dumb jackasses? Well, did you ever have your riding animals

give out on you when you were many weary miles from your base camp? Having once had the sad experience of being put afoot, we had no hankering to hoof it back on our own two feet, so we rated the stock as top priority, and came back on their four feet instead of our two.

In crossing the higher ranges of the mountains, one often encounters the opposite extremes in climate. As the cold night wind whistles through the pines it nearly chills you to the bone as you lay huddled in your none too wind-resistant blankets, even though you did crawl in with all of your clothes on. The howl of the timber wolves at the edge of the clearing certainly has no warming effect on your spine either, because you know that most likely you will have to crawl out and try to quiet your terrified horses and burros.

Water up here is often a reverse problem from the low country as we experienced in crossing some of the



Supply train crossing El Rio Fuerte

deep canyons with their rushing streams. It was sometimes up to the bellies of the pack burros, and a stumble on a hidden rock or a slip into a sink hole of some semiquicksand would mean a drenched pack, and that is no laughing matter when it happens to be your limited supply of food.

These sour parts of the expedition are soon forgotten however, when you experience the thrill of finding several new plants as well as some previously known one, but in a different habitat and with some new variations. Our first major discovery was the three-foot wide clusters of the beautiful yellow-spined *Mammillaria Lindsayi* Craig¹ which was named in honor of my congenial companion of the trail, Mr. George Lindsay of Lakeside, California.

A most unusual variation of another plant was exhibited in what we believed

to be either *Echinocereus Schceri* (Salm-Dyck) Rümpler or *E. Salm-dyckianus* Scheer. Various types of this species had been observed for several days as we were crossing the many ranges, tablelands and intervening canyons, but this particular plant, which we found near the village of Metate, Chihuahua, was nearly the superlative of the unusual for it was found growing from the roof of a shallow cave. It hung down about three feet as compared to the normal upright growth in that locality of three to five inches. Evidently, the seed has been carried into the cave by the wind, and had lodged in some moss and humus on the roof, and had grown there upside down into the very elongated form.

The goal of the expedition was the Barranca de Cobre del Rio Urique in central western Chihuahua. This canyon resembles somewhat the Grand Canyon in Arizona but it is not quite

¹Cact. Sucr. Journ., XII, 182, 1940.



Barranca de Cobre del Rio Urique

as deep and the slopes are largely covered with trees and shrubs. Like the canyon of the north, you are not aware of the big chasm until it bursts out in full view just as you approach the edge of it. The rim is formed by a sheer canyon wall which drops off for fifteen hundred feet or more, and this presents a very definite dividing line in the type of flora to be found there. The colder pine forest, through which we had been traveling, comes nearly up to the very brink, but at the edge of and over into the canyon it is typical oak and semitropical growth. This can be explained to some extent by the draft of warm air that can be felt quite decidedly coming up from the canyon, so that when a handful of dust and leaves was tossed over the edge of the cliff, it was carried right back up and well into the air above the brink. Here at this botanical border line we were most pleasantly surprised when our head guide asked us if we would like to have

a plant that he had found down on the cliff. We immediately wanted to explore its habitat, but he said that he could not let us go down as it was too dangerous for us to attempt it, but that he would make another trip down again to see if there was any more like it; but he had no luck in finding any more than just the one plant. This plant has been the subject of much detailed investigation by several well known authorities on succulent plants for several years, but Dr. Robert T. Clausen of the Department of Botany at Cornell University, Ithaca, New York, has concluded that it is an entirely new species, and has given it the name of *Sedum Craigii* Clausen.²

At the same location we had the pleasure of finding an extension of the distribution of a most attractive little rosette-like succulent with terminal hairs on the ends of the leaves. It has been identified and reclassified by Mr. Jack Whitehead of University of California Botanical Gardens at Berkeley, California as *Graptopetalum filiferum* (Watson) Whitehead.³

Notwithstanding the rumors of an unfriendly attitude of some of the Indians of this region, we experienced no difficulties when we kept our noses out of their private affairs (good advice in any man's country). Where others might have encountered some opposition, we made many friends along the forest trails by taking time out to administer to some of the aches and pains of these mountain people whenever possible, although sometimes it was a little inconvenient for us to do so. One morning an old man came into our camp just as we were ready to hit the trail. He had hiked about three miles over the mountains to see if we could do something for a toothache that he had been experiencing for the

²Act. Succ. Journ., XV, 105, 1943.

³Act. Succ. Journ., XV, 69, 1943.

past six moons. (The grapevine of the brush country is certainly a remarkable broadcasting system in spreading the news of our presence in the country). Of course nearly everything had been packed, including the first aid kit, and we knew that there was to be a long day of rough riding ahead of us, so we wanted to get an early start; but seeing that he had come so far, and a glance into the old codger's mouth revealed that he certainly was in need of attention. While the other members of our party unpacked the instruments and got some water from the canteen on to boil in order to sterilize what "civilized people" call the tools of torture, I attempted to "scrub up" in the thin mud at the spring, as there was no other water available at this camp. After administering a local anesthetic, I removed six teeth that were in a very bad condition. The expression on the old fellow's face will certainly always be remembered, as he could not understand how it was possible to relieve him of those aching choppers without hurting him. He went down the trail with his teeth in his hand and kept muttering to himself "teeth out, no hurt." The appreciation and friendship of these simple people for a service rendered to them is well worth the time spent even though it would mean harder traveling to make up the time lost so as to get to the next spring before night fall.

In as much as we were in the Tarahumara Indian country at Easter time we had the very fortunate opportunity of "participating" in the festivities of the season. We were not only permitted to witness, but also obtained moving pictures of the famous Tarahumara ball game which is an almost superhuman display of endurance that makes our modern football game take a back seat. That part of the Easter service at Choro which was held on



Church of Choro, Chihuahua

the night of Good Friday (to which we were not invited, but which we did attend against our better judgment) nearly had a tragic ending. Although the spirit of the season is Christian in nature, there is still considerable of the pagan influence in evidence in their interpretation of it. The presence of intruders in the midst of their religious ceremonies offered them sufficient excuse to revert to some of their pagan tendencies. The continued possession of our scalps was doubtlessly contingent upon our cool heads instead of a hot trigger finger, although it was very tempting to resort to the latter method. The next day we were able to square our account with the tribe by performing an operation upon the daughter of the chief "under rather unfavorable conditions" to say the least. In as much as everything turned out satisfactory and amiable relations were established we did some trading with the Indians for blankets, etc. When the time came for us to depart the chief

came out to see us off and he bid us farewell with a most touching adieu: "When your footsteps brings you this way again, my house is your house."

If only these little plants could talk,

many interesting sidelights of the expedition could be related which we failed to make a memo of in our field notes.

ROBERT T. CRAIG.



A species of Tillandsia often grew in large numbers in the native vegetation. These are growing on "ocotillo"—Robert Flores. (See page 309.)

The Gardener's Pocketbook

Sweet-scented Daphne

Daphne odora has so much to commend it for the rock garden and the garden yet it is not commonly seen. It is usually killed by kindness. It suffers from what is done and not from what is left undone. Neglect, starvation to force bloom, and withdrawal of surplus water by free drainage, are the essentials. Increase of plants vegetatively is difficult except in skilled hands and also being a slow grower, are contributing reason for not seeing it more generally grown.

The growth is compact with ultimate height from two to four feet and a little more in diameter and looks well at all seasons because it is evergreen and

moreover requires little if any pruning. A small branch with its sprig tips in bloom makes an attractive corsage as the foliage alone provides a dainty leafage. It is a modest flower associated with refinement and good taste.

The fragrance is said to be about the most powerful of any plant in the world. This is a broad statement but anyway, it is remarkable how one little twig of bloom will scent a whole room with its delicate mild fragrance. Somewhat such as the violet, it is elusive and not oppressive and yet penetrative, particularly so in the garden where for some distance about its delicate fragrance is in the air.

The *Daphne* is generally classed with the rhododendron, azalea, and the



George A. Furniss

Sweet-scented Daphne

heather. It is a companion to the extent of location free from harsh winds and hot sun. In fact peat, or acid soil conditions are apt to develop a soil fungus, called *Phytophthora cactorum* causing crown or root rot. The frequent recommendation of acid soil, or acid reacting, probably comes from the practice of large producers, especially in California, Oregon and Washington of growing seedlings and cuttings in sand and peat for the first year. It is a fast growing medium. The plants are then grown on in neutral soil that is loose, rocky and moderately fertile.

It thrives under many variable conditions and tolerates 10 degrees F in

the open. Does well in subdued sun or in shade with strong overhead light such as on the north side of a house. Blooms on two years' wood and the liberal cutting of flower-sprigs is sufficient pruning other than to keep it shapely. Blooming is stopped or restricted by excessive shade, by soil kept constantly wet, and frequent use of fertilizers . . . better without enrichment unless soil shows impoverishment.

Considerable skill is required to propagate from cuttings and a long time from seed so the home gardener had better resort to layering. In the spring a bottom branch is well pegged down

under about four inches of soil. The tip end is elbowed up at a sharp turn and tied to a stake to keep it rigid. This stricture in the sap flow induces rooting which may be helped by cutting a few tongues or niches back of the bend. Severance and transplanting may be done the following spring. For the colder climates north of Washington, D. C., plants may be grown in pots or tubs outdoors during the warm months and thereafter moved indoors in a moderately moist atmosphere. In layering, should the tip be allowed to lie horizontally, the branch may continue its outward growth without rooting.

There are three varieties, introductions from Japan and China, all profuse winter and spring blooming and handsome foliage:

Daphne odora has creamy white flower clusters and shiny green foliage.

Daphne odora variegata (marginata) Leaves edged with gold and pink flowers.

Daphne odora Rose Queen; Pink flowers larger and deeper color than above and plain green leaves . . . a general favorite.

Our gardens like our wearing apparel and our household furnishings, are subject to style changes. In order to keep up with introductions and also keep up with the Joneses, we take out the old to make room for the new.

Thus our gardens too often part with standbys for expectations and subsequent disappointments by not looking before leaping.

GEORGE B. FURNISS,
Oakland, California.

A Few Notes on Herbs

To have the best success with herbs they should not be placed in one class or considered alike in their habits of growth. After all they belong to many

different families and come from the far ends of the earth.

Basil originated in India and is not hardy, it shrivels at the first frost, though oddly enough holy basil, *Ocimum sanctum* sometimes seeds itself in my New York garden, which means the seeds live through very cold winters. However basil for flavor is not planted before it is safe to sow okra or put out the plants of egg plant. Purple basil has proven a bit fussy and is started indoors in a pot or flat and transplanted to the garden after it has made a good start. Purple basil is decorative with its leaves as if burnished with a bronzey finish, sometimes revealing green here and there on the veins or in splashes. It is particularly handsome among grey-leaved artemisia, marrubiums or the grey mints. It tastes much like green basil.

Sweet marjoram, *Origanum majorana* is perennial in the South. It can be carried over the winter, up North, in pots. The seed does not keep its viability long, so it is important to buy it from reliable sources. A small amount of seed can be planted in a pot in February and then transplanted to a flat and finally into the garden, when all danger from frost is over. Three or four plants are sufficient to supply the needs of a family.

Fennel, dill, anise, chervil, summer savory and borage, all, can be planted in the garden as soon as the elms are in flower, for here, they are the first trees to bloom after the willows, or they can be sown simultaneously with spinach and lettuce seed. Tarragon plants are dug up and wintered along with chrysanthemums, that is in a dry and sheltered frame and so is thyme. Sage, once it has started, along with pot marjoram, sorrel, and chives, are divided in the autumn and left in the garden all winter, under a light mulch. Lovage and sweet cicely are very har-

dy, too, but do not need dividing. The mints are mulched with a light covering of humus. Balm is not too hardy in my garden, but tastes so deliciously it is renewed yearly from seed planted indoors, so have it mature early.

Several plantings can be made of borage, if it is to be used as a cooked green.

HELEN M. FOX.

Adonis vernalis (Spring Adonis) in North Dakota

The beautiful picture of *Adonis vernalis* that adorns one of the Society's invitations to membership, and which the Editor informs me, was taken by him in the rock gardens at Kew, England, prompts me to say that this dainty little plant is as hardy as a rock on our Dakota prairies. Here its two-inch-wide blossoms of brilliant yellow, appearing above its finely cut foliage with almost the first breath of spring, have an almost startling effect against the bareness of the season.

I started years ago with six plants, but upon my return home after an absence of seven years I found that only one had survived a number of successive seasons of drought and grasshoppers. I was afraid to divide this one lest I lose it, and its seeds were refractory and refused to come up. After searching catalogues from all over the United States unsuccessfully I finally located some plants in Vermont and these have thriven wonderfully for about ten years. Besides, young plants are appearing from self-sown seeds.

A. L. TRUAX,
Crosby, N. Dak.

Chimonanthus fragrans

Every year, the first day or so in January, I walk down the path that leads to The Moon Garden. This I

do just to pass near a tall shrub from which I know I am going to get my first whiff of Spring. When on one of these daily walks I catch a breath of sweetness, I detour off the path to stand by a rather insignificant looking shrub; if a stranger happens to be with me when I reach this particular spot, they want to know what it is that they smell. When I point to the shrub they want to know what it is and they usually go on to say they have never seen it before. This is *Meratia praecox* often called Wintersweet, more properly called *Chimonanthus fragrans*.

I purchased mine about four years ago from Fruitland Nurseries, Augusta, Georgia. At that time it was about two feet high. I planted it in the fall back of an azalea bed at the top of a knoll. Here it is under tall pines and often gets very dry in summer.

The first spring it pushed from the base one tall vigorous shoot with light green four inch leaves. This shoot I cut back about halfway. The next spring we were not here at Ta-Lo and it was not until the following year that I passed again by the Wintersweet. I noticed a fragrance new to me and discovered that the *Meratia* was in bloom. It was now a shrub about seven feet tall and with several more shoots from its roots.

The blooms on my bush are tiny cream-colored affairs and are not outstanding except for their fragrance. I have read recently in Elizabeth Lawrence's "A Southern Garden" that there is quite a difference in the bloom of different specimens and that it is wise to pick yours while it is in bloom. Since my own is the only bush I have seen in flower I do not know how the quality of the flowers compares with others. The *Meratia* can be successfully propagated from layers.

Most of the year *Meratia* is not an

outstanding shrub and, even in bloom, it is a shrub that you have to see at close quarters to appreciate. If it were planted against a dark evergreen background it might show up to better advantage.

The tiny fragrant blooms which hang on the bare branches are marked with little red dots. These branches make delightful Oriental arrangements and one small branch will perfume a whole room. I like to use them in a porcelain Chinese boat that I have and to arrange their angular stems in a windswept line.

Meratia praecox is a shrub which I think could be used more often in the Gulf Coast region. It does not seem to be common locally but it is an old shrub in some regions which was once used more widely. It would still be a good thing to use for variation and winter bloom. The blossoms open every year on schedule in spite of our snap freezes and our sieges of winter rains. It also does not seem to be harmed by summer drought. I have kept my bush cut back but I feel sure it could be trained to a standard form if so desired. In winter the leaves turn to a golden yellow before they fall.

So far my Wintersweet has not been bothered by any scale or insect. It has never been sprayed, watered or fertilized except at the time when it was first planted. It has proved so dependable, however, that I think it deserves more attention and maybe it would reward me with a larger wealth of its blooms.

I know, from now on, I will always want a *Meratia* in my yard if for no other reason than to walk down some quiet path in January and be fooled for a moment or two into thinking that Spring is already here.

BABETTE ODOM,
Tulsa, Okla.

The Prickly Poppies (*Argemone*)

(See pages 324, 325)

According to a catalogue classification of seeds to be sown "as early as possible, early, after warm weather begins and after all danger of frost is past," the argemones fall in the first category. Remembering the tap rooted behavior of most plants of the Poppy Tribe, the seeds were sown very thinly in late March, in a sunny spot with light quickly warming soil. Annual pinks and a few other hardy annuals came up promptly, but no argemones. They dallied until the soil was definitely warm, late April.

The long slender seed leaves look poppy-like but the developing true leaves look more like those of thistles, particularly the handsome leaves of *Argemone mexicana*.

In spite of the thin sowing, there were too many plants and the excess were pulled up and thrown away. Whether only the "goats" were left or whether the seed represented a poor strain in each case, I may never know, but nothing flowered here, that showed the beautiful contrast that one sees in the Southwest, between the coarse though handsome foliage and the delicately tissue-thin flowers. These, particularly in the case of *A. mexicana* were definitely poor.

The first of the pair to flower was *A. platyceras* which has a more slender growth and here at least, a somewhat sprawling habit. By the end of May it was topped by a host of pale mauve poppies which had never shaken their petals free of wrinkles before this office worker was on his way, leaving him only the weekends for observation. There was no range of color, which was regretted since the species is reputed to be normally white-flowered. For picking, the stems must be burned with a flame as for true poppies.



Robert Taylor

[See page 323]

Argemone platyceras



Robert Taylor

[See page 323]

Argemone mexicana

Seed pods came in great abundance and by late June the plants had finished their span. August, however, saw a few volunteers in equally indifferent bloom so perhaps we have here an incipient weed, even though this is far from the natural range of the plant.

A. mexicana grew far more lustily and promised well, but the plants from the packet gave only pale straw yellow flowers and no white. No plant had decently ample petals, so that the beautiful effect of the silken corolla holding the full ring of stamens, about the snowy ovary, was lost. Growth was finished in August.

Those who claim to know the plant in the wild seem a little scornful of it as a garden plant here, but this writer would try it again, were he sure of his seed, since remembering his own hot sunnier climate, which is not always humid respite all stories, and his own diminishing efforts in mid-summer, he is interested in plants that like sun and heat and that can on occasion tolerate a "spell" of either heat or drought or rain!

1946 footnote. No seedling of *A. platyceras* put in an appearance but seedlings of *A. mexicana*, not too many, but enough, have put in their appearance with the chickweeds and the familiar small fry, of the earliest germination. None are being left.

B. Y. M.

From the Midwest Horticultural Society

Rhododendrons and Soil

Some years ago I planted a bed of rhododendrons and related plants in a mixture of sand, peat, and oak leaves. This planting has proved quite successful with only the addition of oak leaves from time to time.

Later in making a planting of rhododendrons at my farm I was confronted

with the prospect of having lots of oak leaves but no peat or sand readily available. In order to take care of the plants I excavated the depth of the beds and then placed the plants in their respective positions and filled in around them with oak leaves that had been gathered the previous fall. This was to be merely a mulch or stopgap until I obtained the other materials.

The plants started to grow and the other materials failed to show up so they remained in the pile of leaves. As the plants took hold the foliage became very dark green and luxurious looking. Summer droughts did not seem to be serious factors to them. By then it was no longer desirable to add sand or peat. Winter came and went and the plants took an even better hold the next spring. Others were planted and this time the oak leaves were the only medium used deliberately. Again the same story. Improved growth, good resistance to drought, and a dark glossy color. Three distinct plantings over four years have been made in pure oak leaves with identical results. Rhododendrons, azaleas, mountain laurel, and blueberries are growing in this medium and any future plantings will be in the same. It is the simplest and the best method that I know of for handling this type of plant without fussing around about special soil mixtures, fertilizers, and soil acidifiers. Just a bed of oak leaves either fresh or partially rotted, and a top dressing of them yearly has given me the best results.

'Mums and Hardiness

In checking through some of the literature on hardy 'mums I was somewhat surprised to see that most of the statements regarding hardiness were mere assertions that the varieties were hardy, sometimes with qualifications such as: not very; extremely; very.

Everything else is left to one's opinion as to what these indefinite terms mean.

All varieties of 'mums are temperate hardy in this region. The important factors that distinguish hardy 'mums from the greenhouse sorts are earliness of bloom, and heaving resistance.

Earliness of bloom is important if flowers are to be obtained before severe frosts kill the tops. This normally occurs around Thanksgiving. Most catalogues give the flowering season so that this point can be easily ascertained.

Resistance to heaving which is the major factor in carrying a plant over winter is dependent largely on the ability of the plant to produce basal shoots in sufficient quantity so that the main stem is surrounded by young growths and is a clump before winter sets in. The basal shoots on the extremely hardy variety *Amelia* (Pink Cushion) form a mass of compact stems and foliage which serves to shade the soil around the plant and the multitude of small roots thrown out by these shoots gives a solid anchorage so that alternate thawing and freezing does not occur. The beautiful variety *Sunkist* forms but one or two small shoots close to the main stem. When this dies and the roots decay there is nothing to prevent the ice from heaving the old stem and the small shoots out of the ground. Where heaving is not a factor any variety that blooms early enough is hardy, but in the heavy soils of the Chicago region survival, or hardiness to most people, is a matter of clump, forming ability. 'Mum growers and experts would do well to indicate this important factor in connection with the description of the varieties if they are to be satisfactory in most of the midwest.

Some Thoughts on Tulips

Shortly before the war I procured several varieties of Darwin and Cot-

tage tulips from a bulb grower in Michigan. These bulbs were grown by him in the sandy soil of the famous fruit belt, and reached me in an excellent condition. The bulbs were as large as any I have seen and somewhat more solid than the imported ones, due likely to the lack of drying in transit.

The bulbs were planted in groups between peonies and shrubs and allowed to naturalize. This year the usual flowers appeared, as large and colorful as the first year they were planted. The number was somewhat less than the original plantings but cultivating accidents have taken their toll as well as the overgrowing of the shrubs. This loss has been slight compared with the labor and bother of lifting and replanting every year.

With the resumption of imports there will be competition between the domestic and imported bulbs. My experience indicates that there is no difference in the two when all factors are considered. Domestic bulbs will likely be higher in price because of labor costs, but should be of better quality as much exposure and handling is eliminated.

ELDRED E. GREEN

Roses

My acquaintance of roses has covered a period of forty years. When I was a boy I helped in my father's nursery in Piqua, Ohio. The soil was a fertile clay loam in which it was no trouble at all to grow Hybrid Perpetuals with healthy foliage. I still remember my father and mother out cutting roses which, if I remember correctly, brought 25 cents for a dozen blooms. When cut at 5:30 in the morning "sun time," the dew was on the rose buds, and when quickly plunged in crocks in a cool, dirt-floored basement, they did very nicely.

No sprays for mildew were used.

Hellebore in a small hand bellows and Paris Green as a spray were used for insects that occasionally troubled the roses.

I can still recall the varieties we grew; viz.: Gen. Jacqueminot, Ulrich Brunner, Capt. Hayward, Clio—a white which bloomed sparingly and how exquisitely beautiful it was, Paul Neyron, Mme. Plantier, Prince Camille de Rohan, Mrs. John Laing, Magna Charta, Moss Roses, American Beauty.

In retrospect I think how nice it was that we were spared having an endless number of varieties—few if any we would remember now. At the present we are living in an age of Hybrid Teas, Polyanthas, and Floribundas. New varieties come out each year while only a few ever remain as “standbys.”

I am not interested in new varieties of Hybrid Teas for the simple reason that I know from experience how few ever survive the test of public opinion. After a rose has been out five or more years, one can generally regard this rose as being better than average.

As a general rule a rose with 25 petals is not as good as one with 40 or more petals. A full double rose is one with 40 or more petals.

If one wants fool proof roses, he should plant Radiance and Red Radiance which are strong growers with remarkably healthy foliage.

Growing today's Hybrid Teas is no easy job if you live in a city. If you live in the country and can plant roses in a clay loam soil where they will get the sun 10 or more hours a day, you can't help but have plenty of roses.

Here are some rose pointers set up in menu fashion:

1. Make rose bed 5 feet wide (3 rows with outer rows 9 inches from edge of bed).

2. Plant roses early in the spring about April 1. (March 1 is better if the season is early.)

3. Determine bed height, preferably on level of walk or grass, keeping about 2 inches higher to allow for settling.

4. Keep point where rose joins the wild root on a level with surface of bed. Hill up rose after planting and don't remove hills for three weeks, or until leaves show that growth has really started.

5. Set roses 18 inches apart.

6. Don't fertilize when you set out a rose; feed on July 15 with a complete fertilizer of high potash content.

7. No mulch is required. Break crust of rose bed soil every week or ten days.

8. After established, roses require but little artificial watering.

9. Keep rose bed as clean as a hospital floor. Keep it free of leaves and petals by religiously picking these up and burning them. It is Black Spot and Mildew which you must keep out of your rose garden by practicing clean maintenance and by applying a fungicide once a week from the time the leaves have unfolded until October 15. The fungicide I use is Dow “Mike” Sulphur which is applied between 5-6 p.m. when foliage is dry by using a duster.

10. Use a spray of Black Leaf 40 and C.P.O. (spreader). When Dreft is available again, you may use Dreft instead of C.P.O.

11. When a rose is about to drop its petals, break it off (don't cut off $\frac{3}{4}$ inch of stem) and save yourself the trouble of picking up petals all over the bed.

12. How long a stem shall I cut? If the bush is large, it won't hurt to cut long stems (15-18 inches) but a small bush can allow only small stems (6-8 inches).

13. Hybrid Teas are quite a lot of trouble if you wish to look at it that way, but they are worth the effort. A beautiful rose bud cut with the dew

on it is the best dividend one can secure from garden work.

14. As to rose varieties, some are at their best in spring and some are better in fall; don't discard a rose before giving it a fair trial.

15. Here in Pittsburgh we like northern grown roses (Oregon, Northern Ohio, Eastern Pennsylvania, New York or New Jersey roses).

16. It is not necessary to prepare a rose bed two to three feet deep unless your soil is most unusual. And don't make the mistake of excavating and sending to the dump clay (unless it is the gluey, sticky variety) and filling in the new rose bed with top soil.

17. The rose can be grown successfully over a large part of this continent. One can see beautiful blooms on New Year's in Miami Beach and Nassau and many of us have seen nice blooms in Canada. There are not many woody plants that thrive over such a large area.

As to which roses I like, that is such a debatable question that I will merely say that I personally like Condesa de Sagasto, Duquesa de Peñaranda and Mme. Joseph Perraud because I like warm shades. For those who wish strong growing fool proof roses Radiance and Red Radiance are again recommended.

STANLEY LEONARD,
Pittsburgh 24, Pennsylvania

Edible Horse-Chestnuts

Who has not stood under a spreading horse-chestnut tree dropping its nuts and thought what a waste of food material! If only the bitter, and supposedly poisonous, principle could be bred out of the nut with its paper shell and great carbohydrate content!

Well, the dwarf horse-chestnut, used as an ornamental on lawns, is quite sweet and good, if not excellent. Why

not hybridize the two with the hope of getting a large tree bearing sweet nuts? We know that there are many natural hybrids between the bitter hickory and the sweet shagbark which are edible. The bitter principle is almost completely recessive. Perhaps it would be so with the horse chestnut. By the way, it is said that the "spreading chestnut tree" under which stood the "village smithy," was a horse-chestnut, not a "sweet chestnut." Please don't call a horse-chestnut "chestnut." I once traveled forty miles to see a horse-chestnut tree reported to me by one who should have known better as a large "chestnut" free from blight.

DR. W. C. DEMING,
West Hartford, Conn.

Possible Use for Discarded Iris Seedlings

Orris root has long been used as an ingredient in dentrifices and other perfumed products. The orris of commerce comes from the dried rhizomes of certain species of iris, principally *I. germanica*, *I. florentina*, and *I. pallida*. These have been cultivated for many years in sections of Italy as an agricultural crop. The rhizomes are dug in midsummer, and after the roots and outer skin have been removed, they are carefully dried. The "roots" are powdered for incorporating in commercial preparations. The unground roots are said to be used for teething babies.

In the course of time the orris roots develop a delicate odor of violets. It is reported to take three years for the roots to acquire their maximum strength.

Since the species of iris referred to have entered more or less extensively into the make-up of the modern iris, it occurred to the writer that discarded seedlings might be utilized as a source

of the orris root. Accordingly some miscellaneous material was prepared and dried. At first the product did not look too promising, but now after 18 months the characteristic odor is quite definitely apparent. Whether or not the material will compare favorably with the article of commerce after the full three years' period remains to be seen.

Under normal times there, perhaps, would be little incentive in this country to develop a commercial product, notwithstanding the fact that there is now a decided scarcity in the supply of orris. Never-the-less there might be considerable opportunity for pleasing garden friends by making them the recipient of home grown and home cured "orris root."

W. R. BALLARD,
Hyattsville, Md.

Aquilegia longissima

The publicity recently given others of the western species recalls the story of the above and its final introduction into gardens. In Vol. I of *Garden and Forest*, there is an excellent drawing by Faxon, the master of such subjects who helped Sargent with his work until the publication ceased. At the time, prior to 1890 I was concerned in the introduction and cultivation of hardy herbaceous plants, the illustration noted fired me to "get seeds" but alas, the habitat was rather indefinite, as I remember it is Southwestern United States. It appears that Texas is favored also.

Well, the years went along until a Santa Barbara lady was travelling with her artist husband and came to a gas station where the owner was cultivat-

ing *Aquilegia longissima*. Seeds were obtained and the plant was recognized here at once as the long lost species.

It was cultivated here in the Botanic Garden and seeds were gathered and distributed. After seeding the parent plants died but enough seems to have been used and in the course of hybridizing, vigor was also given the species, as well as other colors. This often happens. The original color was dull yellow. My few plants also died though they were given "desert conditions," but their native shady canyons are very different from my concepts.

A word should be said here of the discoverer. A man could not well be at a gas station cultivating this rare *aquilegia* without having something else in his makeup. He had. I found that in the winter he was or is, the naturalist in the Mojave Desert where I later met him. His name escapes me. He never told me where the plant grew nor where he found it and he is honored for this. The craze for seeds was insatiable for years by the "improvers," but the task was accomplished and now we have a race of long-spurred *A. longissima* with color varieties.

E. O. ORPET,
Santa Barbara, Calif.

Useful leaflet.

There is a leaflet—AIS-18, "How Much Fertilizer Shall I Use," prepared by Dr. Charles E. Kellogg, of the U. S. Department of Agriculture, which gives what amounts to conversion tables for the home gardener who will never be concerned with "tons per acre" or maybe even pounds per acre. He or she will know about pints and/or cups.

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(Continued on inside back cover)

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Robert L. Taylor

Azalea Mai-hime

[See page 378]

Thyme and Thyme Again

STEPHEN F. HAMBLIN

One of the many interesting and puzzling groups of garden plants is the genus *Thymus*. We are not sure whether they are woody or herbaceous plants, but as the woody stems with evergreen leaves persist through the winter they can be considered as low evergreen shrubs. Yet when the tops are killed by winter the plants are perennials. Rehder's Manual describes but few species, but at least 35 species is a minimum estimate. Some 250 "species" names are listed in the Index Kewensis, and perhaps 50 "species" and as many "varieties" are in American gardens. Of 600 total names in the Index Kewensis more than half are synonyms, and at least 170 names refer to *Thymus serpyllum* alone.

There is no monograph on this genus, nor critical comparison of species characters in any present book on botany. Dealers and amateurs have no guide by which to identify species, and endless unnamed forms appear from self-sown seedlings in any collection. The names in dealers' catalogues may mean very little, and unnamed forms are simply orphans.

No plants are native to America, and the center of distribution seems to be in the mountains of eastern Europe, with species native to Spain and North Africa and others in China. Frequently the unfamiliar labels on new plants are but of a form of the abundant *T. serpyllum*. In case of doubt consider that your "new" plant is but a form of this common and variable species. A few hybrids are known, and some plants truly belong to related genera, as *Micromeria*, *Calamintha*, *Origanum*, *Ziziphora*, etc. All species are theoretically hardy in regions of much frost,

but some species are not always hardy in New England, particularly in soils somewhat wet. All species like dry sunny sites and thrive in poor soils even in long summer droughts.

A simple classification is by habit of growth: those like little erect trees without basal runners, and those creeping in mat formation. Of the erect type most common is Common Thyme (*T. vulgaris*), an erect little shrub to a foot, somewhat of the habit of Lavender. The twigs are whitened, rather stiffly erect. The leaves are very narrow, opposite, held rather erect, dull green to grey green in color. In very cold climates, or under exposure to winter winds, many of the leaves are deciduous, and even the twigs may kill back. The flowers are rather small, lilac in color, in small interrupted spikes in June-July. Thus the plant look like a small Rosemary. Native to southern Europe, it has been grown in gardens since the beginning of gardening, particularly as a flavor for foods. Since it is a tiny wiry tree it makes no new basal growths. Thus it may be short-lived, and new plants are produced by layers or cuttings. For uses as an herb there are such varieties as NARROWLEAF FRENCH and BROADLEAF ENGLISH, with leaves more shiny than of the type. Var. *fragrantissimus* and *variegatus* are listed, but seem not available.

Another very erect little shrub is Zygis Thyme (*T. zygis*), like a miniature Heather to 6 inches. The leaves are very small, narrow, deep green, with strong Thyme odor. The flowers are small, rosy purple, in small heads in June. Native to Spain and Portugal, it is not truly hardy in sub-zero winters, but it is as hardy as Lavender.

Slender Zygis Thyme (var. *gracilis*) is very slender, the branches decumbent and often rooting. The leaves are small, very fleshy, deep green, in effect of a dwarf green lavender slightly limp in habit. The flowers are small, white, in loose whorls in June. The plant has a definite turpentine odor.

Winter Thyme (*T. hyemalis*) is like to Common Thyme, a foot tall, very branched, the many narrow leaves pale green with recurved edge. It looks very like a small Rosemary, dyed pale green. The flowers are palest pink, in narrow whorled spikes in June. Native to Spain, there is a limit to its hardiness in northern winters. It is not strongly fragrant, and resembles a small plant of Hyssop.

Pepper Thyme (*T. piperella*) is a tiny erect fleshy bush, with tiny ovate shining leaves of peppery mint odor. The flowers are large, few, of deep pink color. The effect is as of a tiny Savory. These are the list of the tree-like species known to be in gardens in this country.

Mother-of-Thyme (*T. serpyllum*) is the usual creeping sort and endless are its forms. Some forms are but an inch or two tall and the other extreme is a wiry shrub nearly a foot high. It forms large mats in dry and stony soils, creeping rapidly and seeding itself widely. As a species it is native from western Europe to Eastern Asia. Geographic varieties are listed by botany, and varied garden forms appear in every garden. The leaves may be large or small, clear green or gray downy; the flowers white, purple or red, in small clusters or in several whorls; and the date of bloom will vary from early June to late summer. The only way to keep a plant true to original form is by division of the matted clump.

Many forms have clear green foliage, without hairs, or hairy only on the leaf

margin. One of the most dwarf forms is White Mother-of-Thyme (var. *albus*), scarcely an inch high, the leaves very pale green, hairy only on their edge. The pale green color holds all the year. In June-July there are tiny pure white flowers in small whorls. This plant is very aromatic and one of the best of the dwarf forms. Rarely there are taller forms with white flowers, different from the dwarf variety. PINK CHINTZ has the flowers both pink and white in the same cluster; late bloomer.

The var. *micans* is equally dwarf, with very narrow pale green leaves, shining green, with few flowers, pale purple in color. The odor is of floor varnish. Perhaps it is a true species. ANNIE HALL is also very dwarf, bright green in foliage, the flowers pink.

Taller, some 2-3 inches high when in flower, are such as var. *carmineus* (Carmine Mother-of-Thyme) with smooth deep green foliage, the flowers deep rose purple in late June; Scarlet Mother-of-Thyme (var. *coccineus*) differs in flowers deep scarlet; Purple Mother-of-Thyme (var. *purpureus*) has deep purple flowers, darker than usual; Rose Mother-of-Thyme (var. *roseus*) has small flowers of pale pink purple, early in June; Red Mother-of-Thyme (var. *ruber*) is pure crimson near spectrum red; Firefly Mother-of-Thyme (var. *splendens*) is a bright rosy purple. Other color variations can be named.

Mountain Mother-of-Thyme (var. *montanus*) is larger in every way than the usual species, rising to 6 inches, the leaves large, clear green, the pale rose-purple flowers in large heads. Roundleaf Mother-of-Thyme (var. *nummularius*) has wide rounded leaves, a sort of wiry Moneywort. Its flowers have not been noted.

Lemon Mother-of-Thyme (var. *vulgaris* or var. *citriodorus*) is a tall wiry

type growing even to nearly a foot tall, with rather woody stems, a bit like *T. vulgaris*, but with many stems rather than one main trunk. The oblong leaves are dark green, with strong lemon odor. The flowers are rose-purple, in July, often not numerous. This is a distinct variety and very popular; the pure lemon odor is the special character. There is a variety with the foliage very pale yellow-green.

The variegated forms of this species are usually rather tall sorts, though temporary colorings of foliage may be found in the dwarfier forms. Whiteleaf Mother-of-Thyme (var. *albo-marginatus*) has the edges of the leaves pure white. SILVER QUEEN (var. *argenteo-variegatus*) is very tree-like to a foot, the small narrow pale green leaves irregularly edged white, or nearly wholly white on some twigs. Rarely does it bloom, but its silvery color is very attractive. Silver Mother-of-Thyme (var. *argenteus*) is another silver form, perhaps not different from SILVER QUEEN. Whitespot Mother-of-Thyme (var. *variegatus*) has white dots within the pale green of the foliage. Golden Mother-of-Thyme (var. *aureus*) has its young twigs yellow, and many of the smaller leaves remain clear yellow, but turn in summer to light green. This holds its color well in spring and autumn, giving a definite golden effect. The flowers are few, purple. This was formerly much planted at the base of sundials, for "Time is golden."

These silver and golden variations may appear on parts of any plants, to be separated and propagated by cuttings. Keep in fullest sun and give little plant food. At times they will produce twigs of normal green foliage, and these should be taken out at once.

With green foliage, but softly downy, there are several forms. Dainty Mother-of-Thyme (var. *pulchellus*) is a low grower, the small oval leaves softly

green hairy. The pale rose-purple flowers are in round heads early in June. The odor is not strong and the plant is unlike the usual type in the many soft green hairs. Lilac Mother-of-Thyme (var. *cinereus*) is softly downy, the flowers pale lilac. Var. *carnosus* is very dwarf, the leaves dark shining green, but very green hairy when young. The flowers are pale pink-purple in early June. Note that the young seedlings are very soft hairy. Many other seedlings are very hairy downy, but green in color.

But some forms are not only downy, but gray downy — not green at all. Most distinct is Woolly Mother-of-Thyme (var. *lanuginosus*), very flat on the ground, very gray downy, reddish in winter's cold. The flowers are rare, bright rose-purple in early June. There is very little odor. It is a distinct mat of woolly gray foliage. Var. *lanatus* is similar, less compact and not as gray, for the green color shows somewhat.

Downy Mother-of-Thyme (var. *villosus*) is also more loose in habit, very gray in color, but less downy, in creeping mat. Usually it blooms freely in June, soft rosy-pink just above the gray foliage.

Some of the listed varieties are little seen or known, or else at times are not true to name. More notes are needed on such as var. *balticus*, var. *ericaefolius*, var. *kotschyi*, var. *latifolius*, var. *maximus*, var. *minor*, var. *ochrus*, var. *squarrosus*, etc. Other plants often listed as varieties are more properly true species, as var. *chamaedrys* is *T. glaber*; Var. *britannicus* is *T. britannicus*; Var. *marschallianus* is *T. marschallianus*; etc.

Very like to *T. serpyllum* are other species in endless list. First, those with smooth green foliage. British Thyme (*T. britannicus*) is a dwarf creeper of hairy green foliage. How it differs

from *T. serpyllum* only botany can say. *T. azoricus* is another creeper, shining green. Apparently it is only a form of *T. serpyllum*, and it is not as hardy as the type. *T. pannonicus* is quite erect, but still in loose mat. The tiny oblong leaves are dark green, hairy only on the edge. Close heads of pink-purple flowers appear in mid-June. It has the usual Thyme odor. Carpet Thyme (*T. przewalskii*) is the form of *T. serpyllum* from eastern Asia, but scarcely different from the European plant. Tiny Thyme (*T. caespitius*) is a minute plant with tiny narrow leaves found in wet moors in Spain and Portugal. Apparently it is hardy, but it likes not the long droughts of American summers.

Conehead Thyme (*T. capitatus*) has narrow stiff leaves, but the flowers are in close heads, bright lilac, like a small clover. This is very distinct in flower form. Scandinavian Thyme (*T. glaber* or *T. chamaedrys*) is in dense thick mats with oblong deep green leaves, very smooth and shining. The plant looks like some of the Australian Veronicas. The flowers are large, in large oblong heads, light rose in color, in effect of a pale Crimson Clover, in late June at 4 inches height. It is a very showy species in flower and distinct in its foliage. It is very hardy, and a robust grower, common in Europe. *T. jankae* is similar, but taller (to 8 inches), in large loose mat, the leaves large, oblong, dark green and smooth. The flowers appear in late June in rounded heads of lilac color. The plant is not unlike the usual *T. serpyllum*, with a strong odor of floor varnish.

Caraway Thyme (*T. herba-barona*) is a slender prostrate plant, rather bare of foliage, in thin creeping mat, the whole plant with strong and special caraway fragrance. Native to Corsica it is fully hardy and has been widely planted.

Redstem Thyme (*T. cinicinus*) is a very slender wiry plant, the twigs definitely red in color. The few leaves are narrow, normal green, with strong odor of some powerful disinfectant, or a rancid formic acid. It has the worst odor of any Thyme.

T. marschallianus has pale green stems, rather coarse, upturned to 6 inches. The leaves are an inch long, pale green and quite downy. The flowers are palest pink, very small, in long whorled spikes in June, like a dwarf Catnip. The odor is as of musty old wood—very different from most species. Usually it is listed as a form of *T. serpyllum*. Pungent Thyme (*T. odoratissimus*) is also very wiry in a tangled heap to 6 inches. The leaves are narrow and long, soft green hairy. The flowers are purple in large clusters, like a robust state of *T. serpyllum*. The Thyme odor is very strong, but pleasant. *T. comosus* is supposedly another form of *T. serpyllum*, in loose tangled mat of downy green foliage. The flowers are a soft pink in enormous oblong heads with colored bracts, like test-tube cleaners dyed pink, in July. There is also a var. *haynaldi*, the form most seen. In bloom it looks like no Thyme, for the tubular plumes of silken threads are of some strange clover. When not in bloom it is another green downy Thyme.

The species with gray-green foliage are several. Woollystem Thyme (*T. lanicaulis*) is a stout plant in stem, in tangled mat to 8 inches, all parts of the plant softly gray downy. The narrow leaves are covered with a gray wool, the most wool-like of all species. The pale pink flowers are quite large, in dense oblong heads in June, perhaps too pale to show off well against so much gray foliage. The odor is strong of camphor, unlike that of any other species.

Sicily Thyme (*T. nitidus*) stands quite erect as a dense shrub, but the little oblong leaves are silvery, not hairy. It is like a minute erect silvery Yew with Thyme odor. Rosy-lilac heads of flowers appear in July. Although found in Sicily, it is quite hardy.

Hairy Thyme (*T. hirsutus*) is tufted erect, the leaves softly hairy. The flower heads are pink. Native to the region of Greece, the growth is like a small Galium. *T. cephalotes* grows as a dense dwarf shrublet to 6 inches. The little leaves are gray downy. Deep pink

flowers appear in close flattened Armeria-like heads, with large purple bracts. There is a strong odor of camphor. This is another distinct Thyme, from Spain.

Thus are portrayed samples of the varied forms taken by Thyme, from tiny green or gray mat to tumbling tangle of wiry stems or erect shrublets like an Australian Veronica. When botanical search can begin again in Europe it will be possible to get seeds of many species not yet tried in this country.

Gardens an Important Cog in German Food Supply

WILBUR H. YOUNGMAN

The food situation in Germany currently focuses considerable attention upon the small gardener and his contribution to the food supply. Farm production seemingly has been expanded to the limit. The same is believed to be true of the commercial truck growers, but the food supplies still fall materially below the needs of the greatly increased population of the U. S. Zone.

The Office of Military Government and the German Civilian agencies are turning to the gardeners, urging that all who can have gardens. This is unnecessary advice after the recent cut in rations which in April was down to 1275 calories and have since reached a new low of 1075. Several cities have appointed official garden leaders to assist the gardeners in obtaining land and to guide the inexperienced so that their efforts may be productive.

These moves are essential if the people of Germany, particularly in the U. S. Zone, are to produce the major part of their food supply. The U. S. Zone is not an important surplus producing agricultural area. Bavaria does produce a small surplus but not enough to meet the needs of Gross Hessen and Wuerttemberg-Baden, the other two states in the zone. Actually the farmers of the U. S. Zone are producing about as many acres of food crops as they can, but with the tremendous increase in population, the food situation can never be easy in the U. S. Zone, which is better known for its scenery than for its grain crops. With the influx of evacuees from the eastern German States and 2¼ million expellees

from the Sudetenland, the food situation is critical.

Perhaps, it would be possible to increase food production in the Zone by changing to more intensive crops, by increasing crop yields by making more fertilizer available, and by providing larger quantities of new seed potatoes. Even with these changes it is doubtful if total production could be increased sufficiently to meet more than a part of the greatly increased requirements.

The same might be said of the commercial truck growers of which there are a considerable number in the U. S. Zone. Lack of fertilizers and labor have been reported as major reasons why their production is not being maintained at a high level. It is not known to what extent suitable soils and equipment are available to permit expansion in this field of production. Certainly, it is an important type; one of the most intensive, and it has been highly developed in Germany.

I believe we can assume that the Nazis, in their efforts to make Germany self-sufficient in food, did not overlook many opportunities to increase the production of feed. On the other hand, we may question the attention given to the growing of such crops as wheat, rye and barley which are better adapted to extensive farming areas where large scale methods of production can be employed.

The third source of food, the private garden, was also highly developed under the Nazi regime. They made considerable use of the Kleingartner, small gardeners who leased land from the cities. They are well organized and



Dwarf fruit trees properly trained furnish fruit, shade, screen and boundary markers.



Many groups of duplex houses, the fruit of the 1929-30 depression may be seen, though not all are as neat and substantial.



Rabbits, chickens, even goats and cows are kept by the Small Settlers according to the size of the plot. In cities, rabbits and chickens with vegetables and fruits supply much of the family food.

U. S. Army Pictorial Service. All views are from Frankfurt, Germany.

are to be found in considerable numbers in each city. This group of gardeners whose origin dates back to 1880 when a German physician named Schraeder, recognizing the importance of healthful out-of-door exercise for the workers as well as the nutritional values of fresh vegetables, organized the movement. It spread to the large cities and was widely adopted as a civic program. About 1936 the Nazis took over the then-called Schraedergarten associations, changed their name to Kleingaerten and made them a part of the Nazi program.

These small gardens are for the most part on city-owned property which is leased to them for a considerable period of years, sometimes on an indeterminate lease at low rates. The annual charge, in many cases, is as low as 3 marks per 100 square meters. In a few cities, or in the more desirable locations, rentals may run as high as 7 marks per 100 square meters. Thus the total cost for an average sized plot of 300 sq. meters (3,229 sq. ft.) ranges from 90c to \$2.10 at the present rate of exchange.

The plots, usually numbering more than 100 in a unit, vary in size from 150 to 700 square meters. The average size is believed to be about 300 square meters. Location, soil and size of family are supposed to be taken into consideration in setting the size. However, the methodical German engineer wants everything done according to rule so he lays out an entire unit, sets the stakes and puts in the pipe lines for water without knowing anything about the families who will be assigned the plots. Hence individual requirements probably have little bearing upon the size.

Frankfurt has probably gone further with the Kleingaerten than any other city. With over 50,000 plots within the city limits they are far ahead of

any other city in the U. S. Zone. They have studied the demand and are controlling the expansion of the city in line with their plans. Each group of apartments is so placed as to be surrounded by or at least be accessible to a group of Kleingaerten. They claim from their experiences that only one family out of 4 can be interested in gardening. However, this ratio has been materially altered by the current food situation.

Frankfurt, as well as all other cities in the U. S. Zone, admits receiving each day many requests for garden space. Unfortunately, few of these cities have been able to meet the demand. Frankfurt may have been more successful since they have modified their methods to meet the situation. Instead of just one type of Kleingaerten, those on indefinite leases, they now have three types. 1. The long time lease, land which is permanently set aside by the city for such use. 2. Land which will not be needed for a few years and so can be leased for 5 years. 3. "Grabeland," land for emergency use only from which the tenant may be removed on very short notice. Consequently he is not permitted to plant fruit trees, erect a shelter or to fence it in. This studious approach to the garden program was not encountered in any other city within the Zone.

In spite of the large number of Kleingaerten in Frankfurt and other cities of the Zone, it is hardly wise to assume that they will each support a family providing them with all of the vegetables needed for a year. Too many of them are over-grown with fruit trees. It is not uncommon to see a 25-year old apple tree, several of them usually, spreading over the entire plot and effectively shading the ground beneath so that only the earliest of spring vegetable crops can be grown. Of course there are many plots in the

Kleingaerten where the dwarf fruit trees are carefully espaliered to fences or trellises. Even the gooseberries are commonly grafted to root stocks three or four feet above the ground, which permits the growing of lettuce, onions or other crops beneath them. Where this is done a generous supply of vegetables can be obtained from the average sized plot.

Similar to, but developed for a different reason, are the Small Settler plots, subsistence homes we would call them. The German name is Kleinsiedler. They are small plots of ground with simple but substantial houses which were a product of the 1929-33 depression. Usually on city-owned property, the settler, while owning the house, pays a nominal rental for the land. In Frankfurt the leases are for 40 years, while in Stuttgart the leases run for 99 years.

The small settler plots range in size from 300 square meters to $2\frac{1}{2}$ acres in size. This range is due in part to location but more often to the keeping of animals. Some settlers keep a cow or goats. Others are satisfied with a few chickens or rabbits. All are well supplied with space for vegetables and fruit trees.

The houses in the Stuttgart settlement were built by the settlers who worked in teams under the leadership of a skilled worker. They were built at an average cost of about \$2,400. The houses visited in Frankfurt were built by the city, averaged higher in cost and were more pretentious.

It is not expected that this type of garden program can be expanded to meet the present food shortage due to lack of building materials, although it may have to be expanded to meet the acute housing need brought on by the unwelcome evacuees and expellees. If this is done there will be a corresponding increase in gardens, but in most

cases this will be at the expense of the farm land taken for the settlement. However, this may not be a net loss in food production, as gardens with ordinary good culture should produce more calories of food per hectare than similar areas devoted to wheat.

There are organizations of railway employees parallel to these two groups. They are widely distributed, effective gardening groups. It might easily be assumed that they would have gone out of existence during the war for their gardens were along the railway right-of-way, the most bombed ground in Germany. Even the housing settlements of the railway workers are often adjacent to the tracks, consequently they suffered severely and often. Today, the railway employees are gardening just as feverishly as those whose plots received less attention from allied bombers.

The third major group of gardens, those on private property to which we will refer as home gardens, is the largest in number. While there are no statistics on their numbers today as compared to pre-war or during the war, it is evident that every home owner with a spot of ground is trying to grow some vegetables. Even the space between the building and the sidewalk is spaded if there is enough soil and sunlight to encourage plant growth.

It might well be assumed that the backyards filled with rubble might prove too discouraging to the few families still living in the wreckage. This would be under-estimating the seriousness of the food shortage. Gardens are being cultivated under all manner of handicaps. Imagine planting a garden on a spot that was, before a bomb exploded, covered by your home. Yes, there are home gardens everywhere—everywhere that a few square feet of ground can be found which are not too heavily shaded. As more rubble is

hauled away there will be more gardens.

Private property that is not in use may be taken over by the City and assigned to a gardener. Already the idle lands about factories, the abandoned homes, park lands, etc., are being checked to see if they can be used for vegetable growing. This may seem like wasted effort. It is not, because the thorough-going Nazis put the big or obvious areas to work before the war, hence much of the expansion in gardening today must come through the utilization of small, scattered tracts of ground.

Several German cities are now employing official gardeners whose first duty is to assist gardeners in locating space for their gardens. It is expected that working with the gardeners they will seek out all idle land before turning their attention to the city-owned lands now being used as pastures or for the growing of cereal crops. Unless sufficient idle land can be found, it will undoubtedly be necessary to cancel leases with farmers so that such land may be turned to more productive uses. Certainly, a city is hardly justified in keeping land in pasture that will provide fresh vegetables for several families, but grass enough for only a cow or horse. It is estimated that from 50 to 75 per cent more calories can be obtained from a given area in vegetables than from the production of wheat.

Gardening is not easy today in Germany. Seed supplies, so far, have been sufficient to meet all demands. A few kinds and some of the desired varieties were not available in sufficient quantities, but there were others which could be and were substituted. This might not have been true if all of the gardeners who asked for space had received it. However, seed so far has not been a limiting factor.

Tools have not been available in ap-

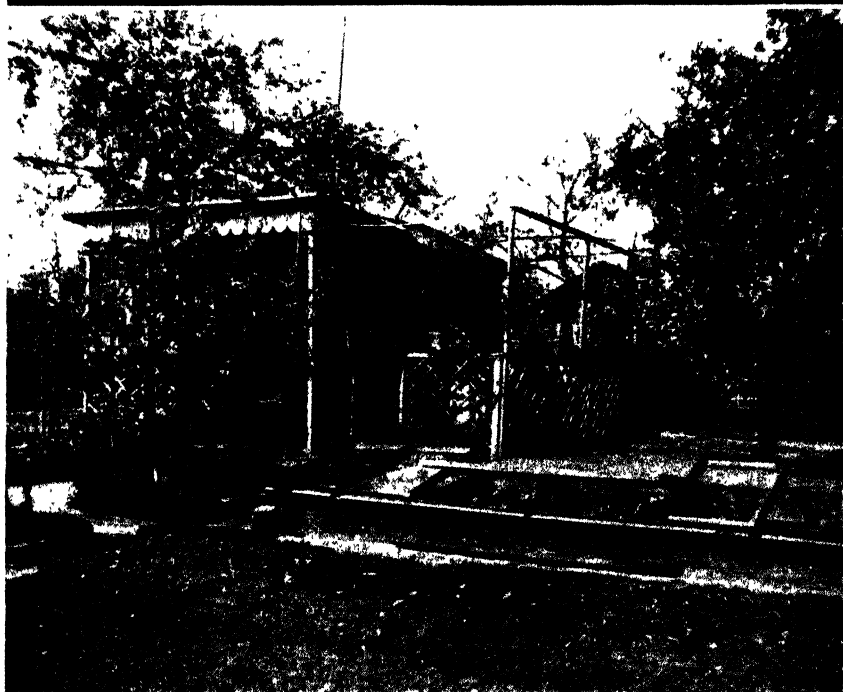
preciable quantities for the new gardeners or for those who lost theirs in air raids. Some have been able to get local blacksmiths to make things for them from scrap steel, but even the handy blacksmith has been limited in his endeavors by the shortage of coal for his forge. Rakes are being made of wood in satisfactory quantities.

Fertilizers for the gardener are not available. The small supplies were allocated to the commercial truck crop growers and to farmers. Germany has ample supplies of potash, but nitrogen and phosphate are exceedingly short. Far below the needs. Gardeners have been meeting this problem by saving everything of fertilizing value. Many gardeners admit carrying stable manure in suitcases from the country. It is not a rare sight to see a woman sweep up freshly dropped horse manure in the street and carry it to her garden.

An enterprising garden leader near Stuttgart discovered that an old city dump contained a large amount of highly valuable fertilizing material. He now has a couple of men sifting out the broken bottles, bedsprings and brickbats. Gardeners are glad to get this material at the nominal price of 7 marks (70c) per cubic meter. It is rich in nitrogen and minerals—a welcome substitute for the nicely packaged fertilizers American gardeners so freely use.

Spray materials are also short, although this is not particularly serious for the vegetable gardener for he can pick off the cabbage worms by hand. If he grows potatoes he can knock the Colorado potato beetle (it migrated to Europe following World War I) into a pail. But, if he wants to protect his fruit trees, he needs Bordeaux and sulphur both of which are scarce and hard to obtain.

Probably the most serious shortage with which German gardeners have to



U. S. Army Pictorial Service

Frankfurt, Germany. A well locked gate and a good high fence protect most of the Kleingarten units. Older gardens such as this are often smothered by fruit trees. Each plot has its tool house, some of which are improved to serve for temporary living quarters. Below. Well organized Small Gardens have shelters, cold frames, compost pit and permanent water supply. Dwarf fruit trees are less harmful to vegetable crops grown beneath them.



U. S. Army Pictorial Service

Frankfurt, Germany: Emergency gardens, "Grabeland," are leased to gardeners for one year, may not have fruit trees, shelters or fences. Plots vary in size from 150 to 300 square meters, are on city owned land, and rent from three to five marks per 100 square meters. To meet the great demand for gardens it is proposed to seize vacant private owned property and lease it to gardeners under similar terms.

contend is fencing. Why? Fences are needed to protect the gardens from two-legged thieves. Fencing is a serious need under present conditions to protect the gardens from hungry people. There is considerable talk that the city government will invoke the curfew law as one way to stop this theft. However, the gardener is not taking chances on slow acting civil governments. He is building fences from whatever material he can lay his hands on. Much of the vast quantities of barbed wire left behind the retreating German armies is painfully being fashioned into fences. Split saplings, scrap lumber,

plus pieces of debris from wrecked buildings, are being fashioned into fences. Not very sightly, it is true, but at least a partial protection for a family's food supply.

Rabbits, birds, and in a few places, deer are serious pests of the small gardener. Not being allowed to have guns, the gardener is handicapped in protecting his garden. No doubt, some of the more ingenious will try trapping the rabbits, hares as they are called in Europe. Scarecrows, strips of rag, pieces of tin, even broken mirrors are hung up to scare the birds away. The deer will probably be scared away by

G.I. hunters and so will not be a problem for the gardener who probably needs the meat much more than do the hunters.

The home canner of vegetables and fruits is confronted with just as many shortages as the gardener. Glass jars, rubber jar rings, sealing wax as well as fuel for the processing have so far not been made available. Sugar for the canning of fruit is likewise unobtainable. However, it is believed that the German housewife will kraut, dill, dry and otherwise preserve just as much as possible. In addition generous quan-

ties of the root crops will be stored in pits for next winter's use. Perhaps the variety will be lacking, but the home gardener will have done his best to fill the gap created by an influx of unwanted visitors and a supply problem that the farmers could not meet.

The German gardeners are doing their best to produce food—all of the food that they can for they know that the only sure way to eat is to grow it themselves. They are making a substantial contribution to Germany's food supply — much more than you or I realize.

A Maker of Books on Gardening Charles de Sercy-Pirate and Pioneer

MARGERY F. WARNER

One of the first of the 17th century floricultural works to occupy me was the "Nouveau traité pour la culture des fleurs," an anonymous book published by Charles de Sercy, Paris, 1674. This was generally credited to Pierre Morin, on the strength of Barbier, "Dictionnaire des ouvrages anonymes" (3:523), which says the author's name is in the privilege. Haller, "Bibliotheca botanica" (1771, 1:574), and some others considered the work strictly anonymous, but many more recent authorities, even so excellent a bibliographer as M. Georges Gibault of the French National Horticultural Society, followed Barbier's attribution, and few persons had occasion to challenge it.

The book was, however, a translation from the "Manuale de' giardinieri" of Fr. Agostino Mandirola, and the fact had not escaped notice. A certain copy of a later French version by Andry (1765) was found with manuscript notes referring to the previous translation of Mandirola in 1674. From the handwriting, these notes appear to have been written in the late 18th century. This may have been my first clew to the origin of the "Nouveau traité," although there were other things to indicate its connection with Mandirola. It is, in fact, a French rendering of the first two parts or "books" of the "Manuale de' giardinieri," giving the description and culture of flowers, herbs and ornamental plants, to which is added under each species the properties of the plant, from Mandirola's fourth "book" on the medicinal uses and virtues of plants. When I examined the

"Instruction facile pour connoistre toutes sortes d'orangers et citronniers," also published by De Sercy in 1674 without an author's name, it proved to be translated and somewhat adapted from Mandirola's third "book," entitled, "Della coltura e varietà delle agrumi."

Moreover, when a copy of the "Instruction facile" was found with the royal privilege under which Charles de Sercy issued both works, it did not state that the "Nouveau traité" was by Morin; but a number of titles were blanketed together in the same permission, all without names of authors save the last, which was the "Remarques pour la culture des fleurs, par le Sr Morin." There are a half dozen or more different books printed by De Sercy under this same privilege, which was granted 12. May 1673, registered 14. May 1673, and printing completed, in case of the "Instruction facile pour connoistre toutes sortes d'orangers et citronniers," 12. Avril 1674. This inclusive privilege evidently baffled some readers.

Charles de Sercy was then becoming definitely a producer of gardening books. I do not know when he began printing books, or what he issued besides those on horticultural topics. The first I have found with his imprint is the "Théâtre des plans et jardinages" (Paris, 1652), of Claude Mollet. This was not a new work, as it is supposed to have been written between 1610 and 1615, and its author had been dead some years, but it has 22 fine plates signed by his three sons, André.

Jacques, and Noël Mollet, and it is something of a collector's item. This was a good beginning for a horticultural publisher, but some years passed before De Sercy's next venture, the "Remarques necessaires pour la culture des fleurs" (Paris, 1658), of Pierre Morin, which was also important, because it was the first general floricultural work in French. It was followed by the "Instructions pour connoître les bons fruits" (1660) of Claude Saint-Etienne; the "Jardinier royal" (1661) of Guillaume Cardinal; and the "Abrégé des bons fruits" (1667) of Jean Merlet, all works of considerable merit.

Meanwhile, other printers of Paris and the provinces were issuing horticultural books, notably 8 or 10 editions of "La manière de cultiver les arbres fruitiers" of Le Gendre, and twice as many of the "Jardinier françois" of Nicolas de Bonnefons. To complete with these De Sercy reissued earlier books, including two "inferior" editions of Mollet, and sought new works to publish, as well as ways to increase the sale of old ones. Among the latter was addition of extraneous material, which was not always well chosen. Perhaps his first venture of this kind was the edition of Morin's "Remarques necessaires pour la culture des fleurs" in 1667. In which he inserted most of the "Jardinage des œillets" (Paris, Louis Boulanger, 1647). This book was probably even then scarce, and its author was unknown; so it was readily accepted as the work of Pierre Morin, although the latter must have been dead some years. The result was that Morin is more often cited by botanists and gardeners for his (?) "Traité des œillets" than for his own work, although the "Remarques" must have been widely used, as it was reprinted down to 1704, with at least 14 editions.

There must have been a good sale for the "Nouveau traité pour la culture des fleurs" and "Instruction facile pour connoître toutes sortes d'orangers et citronniers", as De Sercy printed 5 editions of the first and 3 of the latter. This was a literary hodgepodge, as he added to the work on citrus two irrelevant items: "Traité de la taille des arbres", and "Secret admirable pour faire venir toutes sortes de plantes, arbres fruits, fleurs, & legumes d'une prodigieuse grosseur", in which the receipt is scarcely longer than the title. The British Museum, commenting on the attribution of the "Instruction facile" to Pierre Morin, concluded that only these two appendixes were actually by him; the fact is that both were either pure compilations by Charles de Sercy or some "editor" employed by him; or possibly bits of antiquated lore found in manuscript or some old book, and used as padding for this volume.

In the following year appeared, also under the privilege of May 12, 1673, the "Abrégé pour les arbres nains et autres" (Paris, 1675), by "I. L. Notaire de Laon". The notary, Jean Laurent, was a real person, and his own work was valuable, but the other contents, on floriculture and melons, are apparently by another hand, and probably originated in De Sercy's printing shop. I do not know whether he adulterated any reissues of his earlier books during this period, but he shortly produced one of his worst frauds, a "Traité des tulipes" (Paris, 1678), which is an inaccurate and jumbled edition of the "Floriste françois" (Caen, E. Mangeant, 1654), by Charles de la Chesnée Monstereul. About the same time, he got out two issues of a "Traité des orangers, citronniers, grenadiers et oliviers" (1676, 1678), which I do not know, but have reason to suspect it is a rehash of earlier works.

A decade passed without striking experiments. In 1688 De Sercy reprinted the "Traité de la jardinage" of Boyceau de la Baraudière or Barauderie, which was first published in 1638 (Paris, Michel Vanlochem), as a folio with 63 fine plates. It had been reissued (Paris, A. Courbé, 1640), but there may have been room for a new edition, and De Sercy's folio (Paris, 1688) gave the original text unchanged, although it used only 43 of the 69 plates. Apparently trading on the fame of this book, he published in the same year, also under the name of Boyceau, a "Traité du jardinage" (Paris, 1688), which is often confused with but is an entirely different work from the folios of 1638 and 1688. It is in "pocket" size, has no plates, and its miscellaneous contents are of slight value. Jacques Boyceau de la Barauderie died before completing his great work, and while it might have been possible for manuscript notes of his to be printed more than 50 years later, De Sercy's reputation makes this extremely doubtful. This popular treatise can only be regarded as one of his most "impudent forgeries".

The late C. Harman Payne, who gave me many data on De Sercy's and other floricultural publications, several of which are here used without special acknowledgment, used to say that Charles de Sercy was a good deal of a "pirate". The running down of publishers' frauds was one of Mr. Payne's major sports, and many are the errors he has discovered in this as in more important areas of floricultural history. He owned many De Sercy imprints, and investigated honest as well as fraudulent ones. But, while I do not condone the publisher's methods, which were particularly flagrant in the case of Jean Laurent, the spurious work in the name of Boyceau de la Baraudière, and the

garbled reprint of the "Floriste françois": neither can I utterly condemn anyone who gave to the world so much horticultural literature that might otherwise have been unknown. I believe De Sercy got his start in publishing the work of Pierre Morin, whom he may have exploited to an extent it is impossible to discuss here; but I doubt if the translations from Mandirola were deliberate frauds, although the publisher must have been delighted to have them win favor through association with Morin. It should be remembered, too, that reprinting works published by others was not necessarily unlawful. Privileges granting exclusive rights for the printing and sale of a book were granted for limited periods, and when they expired, others might obtain permission to print the book unless the former publisher was prompt about his renewal. It gives me a bit of naughty satisfaction to know that De Sercy himself experienced this in case of Morin's "Remarques necessaire pour la culture des fleurs", several editions of which were brought out by other printers while he had no privilege covering the book.

I find about 60 of De Sercy's imprints in gardening literature, and there must have been others. There are 28 titles, comprising a dozen original works, the rest being mostly fairly decent reprints, with a few outrageous piracies. This total may seem small, but it includes by far the greatest proportion of the horticultural books published in France during that half century. On the other hand, his output may seem larger than it really was, because editions were small, and as labor was relatively cheaper than paper and ink, books were often reset to keep them in stock. While much of his activity was due to business enterprise, I believe Charles de Sercy had an idea of

making his "garden library" as complete as possible. His press naturally became an outlet for the literature of the subject, and he published some good works. He kept most of his earlier books in print, and added editions of several published by other printers. In 1676 he got out copies of both *Le Gendre*, "La manière de cultiver les arbres fruitiers", and Vautier, "Instructions pour les arbres fruitiers"; in 1679, the "Jardinier françois" of Bonnefons; and in 1696, the "Nouveau traité de la taille des arbres fruitiers" of Dahuron; and the anonymous "Connoissance et culture parfaite des belles fleurs", which was reprinted with a slightly changed title but identical text, from the original work (Paris, Laurent d'Houry, 1688). And it is my guess that the very inferior "Traité des tulipes" (1678) owed its existence less to De Sercy's wish to emulate La Chesnée's "Floriste françois", than to his notion of a companion-piece to the "Nouveau traité des œillets" (1676).

The first five books published by De Sercy, between 1652 and 1667, all had some weight; but in the 30 odd years of his subsequent career he produced comparatively few new works of great importance. "L'art de tailler les arbres fruitiers" (Paris, 1683), by Nicolas Venette, was one; and I suppose the "Nouveau traité de la culture des jardins potagers" (Paris, 1692), attributed to Garnier, "Jardinier du Roi à la pepinière", was another good treatise. An outstanding publication of this middle period was the "Nouveau traité des œillets" (Paris, 1676), by "L. C. B. M." This was the principal compendium on the carnation of an age that specialized in the development and exploitation of that flower, and it contains most of the contemporary knowledge of its culture and habits, together with a comprehensive list and description of

the known varieties, their history and origin, and many notes on breeders and amateurs of the flower. I do not know whether it suffered any "editing" from the publisher, but he reissued it verbatim in 1698, and it was never published by anyone else, although it was widely quoted and translated, forming the core of the carnation portion of many other books. It is a pretty safe guess that a chapter on "nelken" or "garofani" or "œillets" in a late 17th or early 18th century floricultural book is extracted from or based upon the "Nouveau traité des œillets" of 1676. Its merit is attested by a writer named Goube, of Valenciennes, who nearly a hundred years later wrote a book of the same title (Cambrai, S. Berthoud, 1769), which has sometimes been confused with the earlier publication. M Goube values the work of "L. C. B. M." very highly, and often quotes it as an authority, scrupulously citing title and page.

It was an age of compact gardening manuals. The work of Olivier de Serres at the beginning of the century, although many times reprinted, was falling into disuse, and that of La Quintinie did not come till 1690. The little volumes of Merlet and Bonnefons and the rest were exceedingly convenient, and De Sercy capitalized this fact. While I would not choose one of his copies of certain works in preference to those by other printers, it is a fact that he handled pretty nearly everything the gardener might ask for. By hook or by crook, he managed to print nearly all the important French works on gardening in the second half of the 17th century. He has had many successors, but by all rights Charles de Sercy was the pioneer horticultural publisher.

This is to be remembered, however. Many of the gardening books printed

by De Sercy, even those admittedly genuine, were issued without the author's name or under cryptic initials, and a good many after the author's death. Some have been credited to more than one person, and one or two of the attributions are more than doubtful. There were also many editions of some books, with considerable variation among them. Whatever we owe to De Sercy's enterprise, we should not overlook the fact that, in view of his known frauds, there is an element of uncertainty about his publications. We cannot, therefore, assess them solely on the basis of authorship, but must take them a good deal on their face value. Insofar as some of them have real merit, it is easily recognized, and in many cases has won approval through many years of use. This merit is probably due to the original manuscript, but in view of the "editing" that De Sercy was wont to supply, we cannot in fairness take the supposed authors too severely to task for defects or errors in books that in many or most cases

were published without their knowledge.

I do not know how Charles de Sercy ranks as a typographer, and have no access to works on French printing. To my knowledge he printed mostly handy volumes, and no fine ones with possible exception of the landscape gardening books of Mollet and Boyceau de la Barauderie, which I have not seen. He certainly did not issue any of the sumptuous illustrated flower books of his time and country. My memory turns to rows of small volumes bound in serviceable calf, now darkened by age, which seem to have been made for the use of gardeners. The type was usually small, and there were no elegant formats, though the page was sometimes attractive, and the typography was usually fairly accurate. The printer's mark used by Charles de Sercy during most of his career consists, ironically, of two hands clasped over the initials "C. D. S.", surmounted by a crown, illustrating his motto, "Lo bonne Foy couronné".

Hendersonville, N. C.

Dahlias During the War Years

MORGAN I. RILEY

War has changed everything about and to do with dahlias—except soil and weather, the dahlias themselves and the desire to grow them. The Dahlia Society of Wisconsin summed war's restriction: "Everything else must be subordinated to an all out effort to win this perilous life and death struggle." In 1944 an Austinburg, Ohio, grower wrote: "We have a large farm, one of us is draft age, and anyway food production has to come first." Next year he wrote: "Our son is in Italy. We are out of the dahlia business."

Does war permit new dahlias and trial ground judging and shows and introducing new dahlias? In the two peace seasons 1937 and 1939 (1938 was the New England hurricane) dahlia enthusiasts submitted to Storrs, Connecticut, 155 and 206 seedlings; in the two war seasons 1943 and 1944, 60 and 89; to East Lansing, Michigan, in the same years 150 and 92, then 57 and 92. Thus in the two years of peace dahlia fans entered two seedlings to trial for every one in the two war years.

In 1937 and 1938 growers offered

through the Bulletin, 109 and 88 and in 1943 and in 1944, 37 and 45 new dahlias. Introductions underwent the same drop, the same latest season recovery, and the same two-to-one ratio as trial ground seedlings.

In 1944 at the Maryland trial grounds "due to the severe labor shortage in this area, the Committee has decided not to operate the Trial Gardens at College Park for the duration"; in Cincinnati "some of the members are engaged in war work and had difficulty in finding time to view the Trials"; and in Michigan "many had difficulty getting to East Lansing, as travel conditions were very poor." Four out of four official Trial Grounds in war tested and judged new dahlias; the war closed four out of four unofficial grounds.

"In keeping with the request that county fairs and kindred meets in this section be omitted this season, the West Virginia Dahlia Society announces that its 1942 Dahlia Show will not be held." In May, 1943, out of an Ohio dahlia society comes: "It is with regret that we inform our friends and Dahlia fans that the Ohio State Show will not be held in Wellsville next September. Owing to the shortage of tires, men and women working shifts and other things unforeseen, it will have to be cancelled." But, the South Central Wisconsin Dahlia Society sought and got support: "In a recent poll of the Society members relative to staging a show this fall, the result was 100 per cent for a show." Of 42 shows reported in 1937 and 17 in 1938, 1943 and 1944 did not report or reported none. Of the shows of peace, war closed over four out of ten.

Looking forward in war's spring-times what have been the prospects for usual-sized shows? In Janesville, Wisconsin "the major part of our land is in Victory Gardens," and in 1943 Vine-

land, New Jersey, advertises: "We will grow over 20 acres of soy beans."

Commercial dahlia growers found war allowed them to get gas if they grew vegetables, could get none if they grew flowers only. They grew vegetables—and dahlias.

In announcing its 1943 show the American Dahlia Society throws out the hint: "Fertilizers will be permitted for vegetable gardens—some of the valuable plant nutrients will reach your Dahlias," then trumpets: "Border your Victory Garden with Miniatures and Poms. Grow Giant Dahlias between the rows of pole beans, corn and tomatoes." So this happens in New York: "Although as of yore he exhibited fine Dahlias, it was observed that he hovered with particular pride, like that of a setting hen, over his prize-winning egg-plants, garnished with blue ribbon parsley and string beans."

"With both nitrogen and potash allocated to the manufacturers of war materials, we were going to have to depend on manure and cover crops." Rototox advertises in the May, 1942, Bulletin: "No more Rototox is available." Tools, rubber hose — the old ones had to do.

When the exhibitors looked to see what classes they might show they found the schedule of the North Eastern Pennsylvania Dahlia Society for example "streamlined to meet the exigencies of a war-time show," and people far from New York City took note that "Air Shipment Class is omitted due to restrictions on Air Express."

Short of gas, the Ohio Valley Dahlia Association chose "a central, downtown location, thus facilitating the problem of transportation." The Dahlia Society of Michigan solved the problem differently: "For the amateurs, who may be saving tires, we have arranged to pick up any flowers which can be brought to a central loading point." New York

City grinned: "If the gasoline shortage continues through the Fall, many exhibitors will be obliged to bring blooms to New York on the trains," and bore it: "E. O'Keefe, with the help of his family, carried large flower boxes on the long train ride" to New York.

At Rochester "with so many who are interested, working long hours during these war days, the Society decided again to choose a Sunday." And at Cleveland war's exigence overbore any one flower's habits: "The show date was the earliest in years, owing to the fact our society wanted to cooperate with the garden clubs and Victory Gardens Harvest Festival, the first week in September."

War jolted the Virginia Dahlia Society: "Uncle Sam was taking over the ground which had been the scene of the annual fair for many years." In Bremerton, Washington, the show "was held at U.S.O. headquarters."

Members and friends of the North Eastern Pennsylvania Dahlia Society were "admitted only by the purchase of any denomination of Defense Stamp or War Bond"; and the State of Delaware Dahlia Society reports "quite a large amount raised for Army and Navy relief."

North Eastern Pennsylvania Dahlia Society observed how: "Due to gas restrictions our own membership was unable to transport as much stock as in former years." The Portland (Oregon) Dahlia Society lamented: "For many years this annual show has been noted for its magnificent floor and wall displays by commercial growers. Due to lack of help and transportation difficulties and loss of many of our growers this feature of the show was missing."

At the Washington State Dahlia Society show: "While the number of entries was far below other years, the blooms shown were excellent and the

show was well attended." War certainly did pull in one show's belt; the Peekskill Dahlia and Gladiolus Society held their show among "kitchen cabinets and dining room furniture in the home of Mr. and Mrs. F. C. Kunzhals. The judges were hard put to make decisions, as the flowers were of exceptional quality."

The American Home Achievement Medal is each season's most earnestly contested award. Thirty-four were awarded in the two years 1937-38, 23 in the two years 1943-44 — three in peace to two in war.

At the Mid-West Conference show "Due to war restrictions several of the awards which previously consisted of silver cups, etc., were replaced by items made of non-critical materials such as beautiful vases, etc." The National Capital Dahlia Society reports: "Our awards committee awarded \$113 in War Stamps, fertilizer, grass seed, and two trophies."

In 1944 the Ohio Valley Dahlia Association reports "this the best show of the past four years. There were more entrants interested, more flowers shown, and a much greater attendance than usual." Others did not so well, as the Baltimore Dahlia Society: "While the show was not staged on the large scale as has been our custom we did live up to our reputation for showing the best in dahlias."

War has done these things to the new dahlias. Has the dahlia fan been able to buy the older dahlias, the standbys? Clarksburg, Indiana, pictures the growers' difficulties: "Our two sons have been in the armed service for two years, and other young men who helped us have also done likewise. War has certainly retarded our Dahlia growing." The Portland (Oregon) Dahlia Society "has planned to take care of the lifting and storing of the bulbs for members in the service."

Eleven growers tell me they grew 123,700 hills in 1937 and 1938, 97,970 in 1943 and 1944. Those who raised vegetables were six out of the twelve in 1937; they became eleven out of the twelve in 1943.

Then, if they had raised dahlias—most continued—when they came to getting out a catalog war took much or all of their paper. Little Silver, New Jersey, met the situation: "Owing to the acute shortage of paper, we are reducing the size of our 1944 List to the lowest point possible." Some mimeographed where before they had printed; some superprinted the current season's date on last season's catalog; some put out no catalog, like Janesville, Wisconsin: "We are at War — there is more important use for paper than in a Dahlia Catalog. You get no catalog this year."

But for all his difficulties, hurdles, restrictions, the dahlia growers' response to war was like yours, like mine—as in Olympia, Washington's: "Defense stamps accepted up to \$3.00"; by Geneva, Ohio's: "We have pledged ourself to give free Defense Stamps with all purchases made after Feb. 1, 1943," who later writes: "I am not selling any dahlias for the duration. I am working with an aircraft plant"; and by Baldwin, Long Island's: "Giving 10% of the purchase price in Defense Stamps."

The war has settled even dahlias' names. In 1940 it was Kentucky Sweetheart and Yellow Glory, Autumn Rose and Eventide, actually Progress. But 1943 saw The Blitzkrieg and Pearl Harbor; saw Wake Island and Kiska, Commando and The Ranger, WAAC and Waves and Wings, Stalin and Winston Churchill, General Wavell and Lidice. In 1945 it's D-Day, Moscow, Flying Fortress, Radar, V-Day and curiously, General John J. Pershing.

The war kept members from meetings. The Ohio Valley Dahlia Association describes in 1943 how "Many Dahlia fans are too busy with war effort to get out to every Dahlia club meeting." From the Mid-West Dahlia Conference comes: "Mr. Swartz thought it advisable to postpone the meeting." The Portland (Oregon) Dahlia Society informs its members: "The August meeting will be combined with the annual picnic as gas shortage prevents making a trip to outside points"; the Puget Sound Dahlia Society judges: "a meeting every month impossible so now we intend to have a meeting about every three months"; and one correspondent writes: "The Englewood Dahlia Society has been disbanded for the duration. The Treasurer is deceased, the secretary is somewhere over seas."

Now we can estimate how much war reduced dahlia activities. 1943 and 1944 compares with 1937 and 1938 in percentage as follows:

	Per cent
Number of hills	79
Pages of Bulletin	68
Achievement Medals	68
Shows	60
Number of Societies	58
Introductions	52
Number of Trial Grounds	50
Trial Ground seedlings	49
Advertisers in Bulletin	38

The top figure is too high. None of those commercial growers replying to my questionnaire grew no dahlias in 1943 and 1944; some in these war years we know grew none. The average of the above per cents is 58. So taking reckoning of those that grew none we are probably not far wrong when we say war constricted dahlia activity to half.

War has allowed dahlias to scrape through with the best scrape they

could. But, in all parts of these United States the hearts of these dahlia people—people of the people—spoke in wartime; I have woven their saying together:

"One cannot merely eat, sleep, and work long hours in defense work. In the limited time allotted to us recreation is essential to physical and mental health if we are to contribute our best to the war effort. I sit in the garden scanning our streamlined dahlia patch

reflecting that few hours are more restful and peaceful than those spent in one's garden. In these days of suffering and strife, things of beauty restore hope and confidence and faith in humanity; we who have gardens can do much to bring good cheer and hope to the hearts of our troubled neighbors and friends by sharing with them the beauty of our gardens. Flowers are more needed in these troubled times than ever before."

Bamboos in American Horticulture (V)

ROBERT A. YOUNG¹

In this concluding contribution in the series² on bamboos in American horticulture, 9 species in 5 additional genera of the tropical clump-forming type of bamboos are considered. It has seemed convenient here to take up the genera and species in alphabetical order.

The Genus Cephalostachyum

Since bamboos, like other flowering plants, are classified on the basis of characters in the inflorescence, and there appear to be no important corresponding vegetative characters in the genus *Cephalostachyum*, no discussion of generic characters will be attempted here. Only one named species of the genus is being considered at this time.

Cephalostachyum pergracile Munro. This species is erect growing, as shown in the photograph of a 34-foot-tall clump at the Federal Experiment Sta-

tion, Mayaguez, Puerto Rico, shown on page 353. A clump at the Canal Zone Experiment Gardens, at Sumnit, is at present about 30 feet high and understood to be increasing. In India, where it is native, *C. pergracile* is reported to make beautiful clumps of 40 feet or more in height with culm internodes as much as 18 inches in length and with diameters of 3 inches near the base of culms. The branches are exceedingly slender but bear relatively large fascicles of twigs with leaves. The leaves are fairly large—up to 10 inches long and from $\frac{3}{4}$ to $1\frac{1}{4}$ inches wide. Information is lacking as to the adaptability of the culms for particular uses.

The Genus Dendrocalamus

The genus *Dendrocalamus* is very close to *Bambusa* and appears to be scarcely separable except on fruit characters. The branching habits in the two genera are not essentially different, nor are the culm sheaths or leaves found to differ in general in any definable or characteristic way. The species that have been introduced into the

¹U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Plant Exploration and Introduction.

²Natl. Hort. Mag. 24:171-196, July 1945; 24:274-291, Oct. 1945; 25:40-64, Jan. 1946; 25:257-283, July 1946.



Federal Experiment Station in P. R.

A clump of Cephalostachyum pergracile with culms 34 feet tall, at the Federal Experiment Station in Puerto Rico at Mayaguez.

United States thus far grow to giant size in their native habitats. The species are *D. asper* (Schultes) Backer, *D. membranaceus* Munro, and *D. strictus* Nees. *D. strictus* has long been

in the country and has been offered by a few nurserymen. This and the other two species mentioned will be discussed briefly below in the order named. *D. giganteus* probably also is growing at

the U. S. Plant Introduction Garden, Coconut Grove, Fla.; in the Canal Zone; at Mayaguez, Puerto Rico; and on the island of Oahu, Hawaiian Islands, but it has not as yet been possible to check with certainty the identity of the plants believed to be of that species. The semi-hardy bamboo long known in southern California and southern Florida as *D. latiflorus* was reidentified as *Sinocalamus oldhami* (Munro) McClure (*Bambusa oldhami* Munro) several years ago by Dr. F. A. McClure. The bamboo originally described as *D. latiflorus* (now *Sinocalamus latiflorus*) is a distinctly different species and has not yet been successfully introduced into this country.

Dendrocalamus asper (Schultes) Backer is a giant bamboo originally described from Java as *Bambusa aspera*, later transferred to the genus *Gigantochloa*, and finally to *Dendrocalamus*. There has been some uncertainty as to the validity of publication of the combination *D. asper* but it appears to have better basis than any available alternative name. A view of two splendid clumps nearly 60 feet high at the Federal Experiment Station, Mayaguez, Puerto Rico, is shown on page 355. It will be noted that though many of the culms are inclined outward, yet they remain remarkably straight. The species is reported to grow to heights of about 100 feet in Java, with culm diameters up to 8 inches; the culm walls are not very thick, scarcely $\frac{3}{4}$ inch in the largest culms. The lower culm sheaths are very short for their width, narrowing abruptly to a narrow apex, with a long, or high, fimbriate ligule; they are stiffly coriaceous and densely covered on the outside with appressed stiff brown hairs; they usually dry to dark or pale brown. The blade is small, lanceolate, reflexed, and rolled inward on the edges; auricles are rudimentary or lacking. The leaves

are quite variable, sometimes very large. Lengths of 5-18 inches and widths of $\frac{3}{4}$ -3 inches are reported in Java; and from Algiers, lengths of 8-10 inches and widths of $1\frac{1}{2}$ -2 inches. This bamboo was redescribed under the name *Bambusa macroculmis* by A. Riviére, from Algiers, in 1879, and a maximum height of over 80 feet (25 meters) was recorded there. The identity of *B. macroculmis* with *D. asper* was recognized several years ago by Dr. F. A. McClure, when he compared a plant of *B. macroculmis* sent to the U. S. Department of Agriculture by Dr. René Maire of the University of Algiers, with authentic material of *D. asper* obtained from the Surinam Department of Agriculture.

Some clumps of *Dendrocalamus asper* at the Plant Introduction Garden, Coconut Grove, Florida, were making excellent progress and had reached heights approaching sixty feet when the hurricane of late October, 1945, struck that locality. They were submerged sufficiently long by salt water to be almost completely destroyed. A few shoots have recently appeared, however, and it is hoped that one or more of the clumps will be regenerated. The species has been established also at the Canal Zone Experiment Gardens, Summit, but has not attained great height as yet. As to cold resistance, it was reported to have endured many degrees of frost at Algiers, but its hardiness has not been put to a real test in this country.

I have found no reference in the literature to special uses of the culms of *D. asper* but presumably they are adapted for at least some of the purposes for which the culms of other giant bamboos are used. The very young shoots, dug before they emerge from the ground, are reported to be eaten in Java (Ochse, J. J. Vegetables of the Dutch East Indies (English ed.),



Federal Experiment Station in P. R.

View of two clumps of Dendrocalamus asper, about 60 feet high, at the Federal Experiment Station, Mayaguez, Puerto Rico. It will be noted that the culms in general are very straight.

p. 310, 1931). Another scientific synonym of *D. asper* is *D. flagellifer*. The Malay name is "bamboo betoong."

Dendrocalamus membranaceus Munro, native in Burma and eastern India, is a giant bamboo reported to attain heights of about 75 feet, with slender culms—the diameters up to only about 4 inches. A very open clump is formed, as is evident in the view of a clump at the Federal Experiment Station in Puerto Rico, shown on page 356. The culm sheaths have the general form and appearance of those of *D. strictus* except that the blade is distinctly narrower than the apex of the sheath proper and the ligule (at apex of sheath, inside of blade) is much more promi-

nent and frequently is conspicuously margined with cilia, or bristles. The leaves are generally small but are quite variable among the different forms grown from seed obtained from Dehra Dun, India; originally described as only 4-5 inches long and $\frac{1}{8}$ - $\frac{1}{2}$ inch wide, they were later reported sometimes to reach 10 inches in length and $\frac{3}{4}$ inch in width. Among clumps from four different seedling origins grown at the Subtropical Experiment Station, Homestead, Fla., some years ago, the maximum length of leaf ranged from 4 to 6 inches and the maximum width from $\frac{3}{8}$ to $\frac{1}{2}$ inch. At Matheson Hammock, in the Dade County Parks, in southern Florida, *D. membranaceus*



Federal Experiment Station in P. R.

View of a clump of Dendrocalamus membranaceus, showing the open habit of growth, at the Federal Experiment Station in Puerto Rico.

has reached 35 feet in height, while at Mayaguez, Puerto Rico, culms have grown to 43 feet, with a diameter of $2\frac{1}{2}$ inches. It is now established also in the Canal Zone.

Dendrocalamus strictus Nees is one of the best known and most valuable of the giant Indian bamboos. A clump photographed on the Henry Nehrling place at Gotha, Fla., in 1909, is shown on page 357. The species is said to reach heights up to 100 feet or more in the Old World Tropics, though 60 feet is the tallest I have seen reported as yet in the Western Hemisphere.

The culms are not of very large diameter for their height but they are exceedingly thick walled, and in some of the numerous forms they are nearly or quite solid; the wood is very dense. The culm sheaths are more or less densely brown or blackish hairy, or bristly, gradually or abruptly narrowing toward the apex, usually pliable but occasionally somewhat rigid, and with a narrow, inseparable blade of the same width at its base as the apex of the sheath. The primary branch at each node of the culm frequently is much larger than any of the 3 to 6 smaller



P. H. Dorsett

A clump of Dendrocalamus strictus photographed at the home of the late Henry Nehrling, Gotha, Fla., in 1909.

ones, and the number of leaves on a branch or twig is, as usual, quite variable—from 8 to 7, 6 to 10, or 7 to 13.

In size of adult leaves there is also great variation, though the average is rather small; the smaller ranges on a

twig are about 2-5 inches long and $\frac{3}{8}$ - $\frac{3}{4}$ inch wide and the largest, 3-10 inches long and $\frac{5}{8}$ -1 $\frac{1}{4}$ inches wide.

D. strictus has about the same cold resistance as *Bambusa tulda*, being seriously injured, if not killed, at temperatures below 27° Fahr. In Florida it is better adapted in general, therefore, to the more nearly frost-free areas of the lower Peninsula. It is understood to be much the most common, and probably the best, of at least three different species of bamboo imported in pre-war years into the United States from India under the trade name "Calcutta" cane, or bamboo, used largely for surf and deep-sea fishing. The imported poles usually are characterized by brownish to black discolorations, resulting from the practice in India of heating the frequently zigzag or crooked culms over a charcoal fire, as a necessary preliminary to straightening. It is, of course, only the comparatively small culms, obtained from young clumps or those so managed that they do not produce many larger culms, that are of suitable size for fishing poles. A system of culture that will yield the desired sizes must therefore be followed. Studies of methods of culture, presumably with this as a consideration, were carried on at the Forest Research Institute, Dehra Dun, U. P., India, a number of years ago, and the results detailed in an extensive bulletin (Deogun, P. N. *Silviculture and Management of Dendrocalamus strictus*. Indian Forest Records, vol. 11, no. 4. 173 p. 1937—now out of print). Before the merits of Tonkin bamboo (*Arundinaria amabilis*), from southern China, had become well known and a supply became available, "Calcutta cane" held first place in the esteem of rod makers as a material for split-bamboo fishing rods.

The Genus Gigantochloa

The genus *Gigantochloa* comprises 25 or more species of bamboo of various sizes, native in southeastern Asia, the East Indies and the Philippine Islands. Only two have been introduced into the United States or its tropical American possessions and established, in so far as I know.

Gigantochloa apus (Roem. & Schult.) Kurz ex Munro, the "bamboo apoos," or "bamboo tali," of the Dutch East Indies, is considered one of the most useful of the bamboos in Java for building purposes and is widely cultivated there. It grows to heights of 35 to 65 feet, according to J. J. Ochse (previously mentioned). The culm sheath and its blade are at first more or less covered with appressed brown hairs, those on the blade being very caducous, and the inside of the blade is prickly-hairy, especially in the center and near the base. The sheaths are without auricles and as a whole are quite variable in details of form, the shoulders being rounded or obtuse and the blades triangular to triangular-ovate, rarely constricted at the base; the base of the blade, about one-third the width of the apex of the sheath, is continued laterally as a very narrow strip (dark brown and conspicuous when dry) to the edges of the sheath apex; the sheath proper is rather stiff and dries to a dull straw color; the apex is quite broad and more or less strongly arched toward the middle; the ligule is short and finely notched. The leaves, dark green above and lighter beneath, are very large, 4 to 18 inches long by $\frac{1}{2}$ to 3 inches in width, and are unequal-sided at the base. Ochse states that the tali bamboo is planted from the plains up to high in the mountains, also that it requires a fertile clayey soil, with abundant moisture. The shoots are said to be virtually inedible.



D. G. White, Federal Experiment Station in P. R.

A young clump of Gigantochloa apus, 4 years from the planting of a stump, at the Federal Experiment Station in Puerto Rico.

Small plants of the tali bamboo were obtained from the Surinam Department of Agriculture by the U. S. Department of Agriculture through Dr. David

Fairchild and the late P. H. Dorsett, with the Allison V. Armour Expedition of 1931-32. The original record concerning these plants (under P. I.

No. 99573) gave the scientific name as *Gigantochloa verticillata*, and the discrepancy has only recently been noticed. The plants appear to agree well in character with the published description of *G. apus* and are distinctly different from an earlier introduction of *G. verticillata* (under P. I. No. 79568), from Sumatra. *G. apus* is now established at the Federal Experiment Station in Puerto Rico, at Mayaguez, and at the U. S. Plant Introduction Garden, Coconut Grove, Fla. At Mayaguez it has attained a height of 53 feet, with culm diameters up to 3 inches at breast height. A photograph of a young clump at that place, four years from the planting of a large stump, is shown on page 359.

Gigantochloa verticillata (Willd.) Munro, a tall slender-culmed bamboo of the East Indies, is reported to grow to heights of 80 feet or more, with culm diameters not much exceeding 4 inches. The lower culm sheaths are strongly triangular, coriaceous, covered at first with short appressed, more or less caducous, stiff brown hairs, and drying to a straw color; the ligule is short and slightly obtuse; at the narrow apex of the sheath is a pair of small, projecting, rounded auricles and a short, lanceolate to linear-lanceolate blade, slightly cordate at the base and $\frac{1}{3}$ - $\frac{1}{2}$ the width of the sheath apex. The leaves are rather large, 8-12 inches long and $\frac{3}{4}$ - $1\frac{1}{2}$ inches wide. The species was introduced from the Sibolangit Botanic Garden, in Sumatra, by the U. S. Department of Agriculture, through Dr. David Fairchild and P. H. Dorsett, with the Allison V. Armour Expedition of 1925-26. It is established (under P. I. No. 79568) at the Coconut Grove Plant Introduction Garden, where it has exceeded 45 feet in height, and also at the Canal Zone Experiment Gardens. The Malay name is "bamboo andong."

The Genus Guadua

Guadua is almost exclusively a tropical American genus, somewhat closely allied to *Bambusa*. It is a rather large and diverse genus and, as we shall be concerned here almost entirely with a single species, the generic characters will not be discussed.

Guadua angustifolia Kunth, a giant tropical American bamboo, is native in many lowland areas from Colombia to Paraguay. It is a beautiful but very thorny species, the lower branches being fairly long and armed with 2 or 3 very sharp and hard thorns, or spines, at every node. Higher on the culm the thorns are reduced and finally disappear in the upper branches. A view of a clump that grew for a number of years at the former U. S. Plant Introduction Garden near Brooksville, Florida, is shown on page 361. The internodes of the culm are rather short. The culm sheaths are long triangular, narrowing at the apex to a very small blade that does not separate from it; the sheath is covered with short, erect, and very prickly brown hairs, which easily rub off. The leaves are 4-6 on a branch or twig, with lengths of $2\frac{1}{2}$ -10 inches and widths of $\frac{5}{16}$ -1 inch.

G. angustifolia suffers frost injury at temperatures below 27° or 26° Fahr. and at 2 or 3 degrees lower is killed to the ground. The clump illustrated was killed "root and branch" early in 1928 in an exceptionally severe freeze, when the temperature fell to 17° F. and remained near or below freezing for 2 or 3 days. The original plant was one of a number grown from seed received from Paraguay by the U. S. Department of Agriculture in 1915. No culms much taller than 40 feet were produced during the life of the clump, because of occasional frost injury and perhaps also the comparative shallowness of the surface soil in which the plants were grow-



Dr. David Fairchild

*View of a clump, 40 feet high, of the tropical American thorny bamboo *Guadua angustifolia*, at the former U. S. Plant Introduction Garden, near Brooksville, Fla. It was later killed in an exceptionally severe freeze. This handsome species attains heights up to 100 feet in the Tropics.*

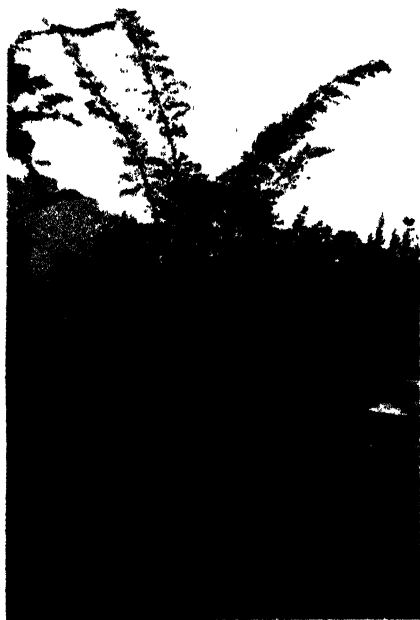
ing. Heights up to 60 feet in Paraguay and 80 to 90 feet in Ecuador and Colombia are reported, while at the Experiment Gardens in the Canal Zone, in a great clump grown from a plant brought from Ecuador, there are culms up to 100 feet tall, with diameters of about 8 inches. It is now growing at the Plant Introduction Garden near Coconut Grove, Fla., and at the Federal Experiment Station in Puerto Rico, at Mayaguez. Tacuara and tacuaruzú are common names used for *G. angustifolia* in the more southern reaches of its range. This bamboo is reported to be found of great economic value wherever it grows in South America, being universally used for native housing and numerous other structural and non-structural purposes. The wood is not very dense but evidently is hard enough to serve for a multitude of uses.

A much smaller guadua, native in the Canal Zone but not yet definitely identified, has also recently been planted at the stations at Coconut Grove, Fla., and Mayaguez, P. R.

The Genus Sinocalamus

The genus *Sinocalamus* was established by Dr. F. A. McClure in 1940 (New Genera and Species of Bambuseae from Eastern Asia. Lingnan Univ. Sci. Bul. 9: 66-67, 1940) to receive four species of bamboos from the genera *Dendrocalamus* and *Bambusa* that were found, by careful studies of the floral characters in the type specimens, not properly to belong in either *Dendrocalamus* or *Bambusa* but which agreed among themselves in essential characters that justified their being placed together in a new genus. The type species of *Sinocalamus* is *S. latiflorus* (Munro) McClure, based on *Dendrocalamus latiflorus* Munro—not yet introduced. As previously stated, the plant originally named *D. latiflorus* is not the bamboo widely known in

southern Florida and southern California by that name. The latter bamboo was, in fact, *Bambusa oldhami*. (now *Sinocalamus oldhami*) but was misidentified as *D. latiflorus* when first introduced (by private agency) some forty or more years ago. Two of the other three species of the new genus that have been introduced into the United States are *S. beecheyanus* (Munro) McClure and *S. Oldhami* (Munro) McClure, the latter as already explained, being the bamboo heretofore widely but mistakenly known as *D. latiflorus*. The fourth species of the new genus, *S. affinis*



Fred P. Farrar

A clump of Sinocalamus beecheyanus, the Beechey bamboo, with culms 35 feet high, which formerly grew at the home of Mr. Fred P. Farrar in Miami, Fla. This relatively quick-growing species, with its robust shoots, is an important source of edible bamboo shoots in its native habitat, southern China.



Courtesy of Julian Nally

A clump of Sinocalamus oldhami (long known in Florida and California under the misidentification Dendrocalamus latiflorus), shown in the background, at the home of Mr. Julian Nally, Gotha, Fla.

(Rendle) McClure, has not yet become established here.

Sinocalamus beecheyanus (Munro) McClure, a clump of which is illus-

trated on page 362, is a medium-tall, semi-hardy bamboo with robust culms and edible young shoots. It is native in southeastern Asia, probably south-

ern China. The Beechey bamboo, as it has been called in this country, is the chief source of edible shoots in the region of Canton and throughout the warmer parts of southern China, according to Dr. F. A. McClure, who collected it for the U. S. Department of Agriculture in 1925; the culms have little or no industrial value. Plants of the species from another source, grown at the Huntington Botanic Garden, San Marino, Calif., were reported in 1937 by Mr. William Hertrich, the Curator, to have survived with comparatively little injury temperatures down to 20° Fahr. The culms of *S. beecheyanus* are a rather bright green, often elliptic in cross section and they form a somewhat open clump. The culm sheaths are glabrous except for a fine pubescence at the base, drying to a grayish brown, and the veins become prominent, giving the sheath a striate appearance; the sheath becomes rather narrow at the apex, which is truncate and is surmounted by a small, triangular, non-separable blade, a little narrower at the base than the apex of the sheath; auricles are lacking; the ligule is of moderate length, $1/16$ to $1/4$ inch on about the lower eight sheaths, and the margin is erose. The leaves are 6 to 10 on a branch or twig and are fairly broad, $3\frac{1}{2}$ -7 inches long and $1\frac{1}{2}$ - $1\frac{1}{8}$ inches wide.

The clump of the Beechey bamboo shown at the home of Mr. Fred P. Farrar, in Miami, Fla., was an indirect propagation from the introduction, previously mentioned, made by the Department. A plant propagated from the original introduction was sent in 1928 to Dr. J. Petersen, then living near Homestead, Fla., but later in Miami. The owner of another clump in Miami, grown from a division of this, furnished Mr. Farrar with the start for this clump. In the meantime, the plants at Dr. Petersen's place had been de-

stroyed in a fire. Early in 1940, just three years after Mr. Farrar had set out his plant, both his and the parent clump burst into flower, and, although apparently very little seed was formed, both clumps died within a few months. The younger one, at Mr. Farrar's place, had produced three large culms up to 35 feet in height in its last year, while in the older clump there were some culms 40 feet high, with a diameter of 4 inches. A number of new plants grew from seeds beneath the clumps, and some were obtained by Mr. T. B. McClelland, then in charge of the U. S. Plant Introduction Garden near Coconut Grove, Fla., for propagation there. A plant of the clone of *S. beecheyanus* grown at the Huntington Botanic Garden had previously been obtained by the Department, through the courtesy of Mr. Hertrich, and it is under propagation. This clone evidently had a different origin, for the plants of it have as yet shown no sign of flowering. The only important synonym of *S. beecheyanus* is *Bambusa beecheyana*.

Sinocalamus oldhami (Munro) McClure, as twice previously mentioned, is the handsome, semi-hardy, giant bamboo long known, through misidentification, as *Dendrocalamus latiflorus* in southern Florida and southern California. A partial view of a splendid clump about 50 feet high at the home of Mr. Julian Nally, Gotha, Fla., appears on page 363. There are two handsome clumps 55 feet high, with culm diameters up to $3\frac{1}{8}$ inches, at the Chinsegut National Wildlife Refuge, near Brooksville, Fla. Isolated clumps are also to be found in many other places throughout southern Florida, including the U. S. Plant Introduction Garden near Coconut Grove. A height of 62 feet for this species is reported from the Canal Zone Experiment Gar-

dens, at Summit. The culm sheaths of *S. oldhami* are much the same in shape as those of *S. beecheyanus* except in having a much wider apex, with the base of the blade greatly extended, equaling the apex of the sheath in width; rudimentary auricles sometimes present. The sheath proper is at first covered with short appressed brown hairs but these largely fall off as the sheath matures and dries; it dries to a somewhat dull straw color and the veins do not become prominent. There are the usual primary and two secondary branches, with a few smaller ones. The leaves, 7-9 on a branch or twig, are 3-9 inches long and $\frac{5}{8}$ -1½ inches wide. The species endures a minimum temperature of about 20° Fahr., as is well known, and is the fourth member that we have considered of this "climatic" group of variously useful, handsome, oriental bamboos that commonly

reach giant proportions; the others are *S. beecheyanus*, *Bambusa tuldoidea*, and *B. ventricosa*.

In closing this series on the more important bamboos that have been introduced and established in the United States, I want to pay especial tribute to my former chief, for many years the active head of the Division of Plant Exploration and Introduction of the U. S. Department of Agriculture, Dr. David Fairchild. He did a great amount of initial work in the study and introduction of many of the oriental and East Indian bamboos, with an unfaltering faith in the ultimate worth to the country of this unique and fascinating group of great and small woody grasses. And it seems a particularly happy circumstance that in his life time there have developed substantial beginnings of a bamboo industry in the United States.

Rhododenden Notes

CLEMENT G. BOWERS, *Editor*

Rhododendrons in the Pacific Northwest

The past decade has seen the introduction of hundreds of new rhododendrons into the Pacific Northwest. Not only have the better European hybrids been imported but species rhododendrons from many parts of Asia. The latter have been grown mostly from seeds acquired from botanical explorations and horticultural institutions and now that many of these species have flowered, we are beginning to realize the world of beauty that can be added to our American gardens.

Few of us have realized in the past the usefulness of this genus or how readily the species adjusted themselves to our climatic conditions. Today there

are many enthusiastic growers in this area and an incomplete list shows something over five hundred different species and several hundred excellent hybrids now being grown.

It is impractical to discuss all of these so, for the sake of brevity, I shall touch briefly on the different series and confine my comments to plants I have personally grown or observed. While these include over 350 species and most of the choicer European hybrids, all have not flowered, but the hundreds which have are indicative of their beauty and permanency. Here, as elsewhere, we have two groups of enthusiasts. One that favors hybrids and one that prefers species. I do not subscribe to either group and believe it is

important that the respective usefulness of each type be understood before forming any definite opinion of their merit. There is room for appreciation of both without prejudice to either.

First, the hybrids are given top honors by many for their adaptability to general garden use and often for the size of the flower and improvement of color and texture of bloom. They have definite advantages in the limited collection or in the more or less formal groupings.

However, since size and grandeur are not the only standards of beauty, there are many species which must be given consideration for in these there is a naturalness, often a delicacy which is without comparison in the hybrids which have been developed so far. For light woodland or naturalistic plantings it would seem to be difficult to omit the species. In rock garden rhododendrons one would lose many of the real plant gems if species were eliminated for here again there are few good hybrids.

One might sum up by saying that the beauty and usefulness of a plant should be the determining factor in evaluating it rather than ancestry or native habitat.

Of course before any of these are considered it is necessary to know if the plant is hardy. On this subject we of the Pacific Northwest have the advantage of long English experience which is very useful as we find that practically all which can be grown there, even in the south of England can be successfully grown here.

We have to bear in mind, however, that hardness is not alone a matter of general climatic conditions or zone ratings, however helpful they may be as general guides. It is more a matter of individual location, exposure, elevation, nearness to salt water and of spe-

cial importance, air drainage. With a favorable location some of these factors may be disregarded but in others one or more of them may often determine success or failure.

Using the English ratings which are widely accepted in this area, a survey made after the winter of 1943-44, which was the coldest in fifty years, showed that the average gardener was safe with plants rated "A", "B", and "C". Plants rated "D" were successful in favored gardens and those rated "E" suitable only for the experienced grower.

Species

In speaking of species, a word of caution. Most of those we have grown have come from seed and one is bound to encounter variations in seedlings. Again, some seeds may develop uniformly good plants, others very poor ones which might better be consigned to a brush fire. Then there is always the chance of a "bee cross" which may be at variance with the true type. For these reasons my comments may be subject to later modification but they emphasize the importance of measuring the type or species by the better forms, not by the poorer ones. It is to be hoped that in the near future the finest examples will be hand pollinized to develop the best possible strains.

Albiflorum Series and Anthopogon Series

These might well be left to the specialist. I have never seen a plant of *R. albiflorum* worthy of a place in the garden and while I have grown only two species of the Anthopogon series, *R. anthopogon* (B ** Eastern Himalaya and Southern Tibet) and *R. tsarongense* (B ** Southeastern Tibet) they come far from measuring up to comparable plants in other series.

Arboreum Series

The two outstanding species grown here are *R. arboreum* (D **** Indian Himalayas) and *R. insigne* (A *** China). While *R. arboreum* is one of the parents of some fine early red hybrids and receives a top rating those I have grown or seen here are not outstanding or up to the early English descriptions of this plant. However, it is quite possible that we do not have the best type and only new imports will correct this impression. *R. insigne* has light pink flowers with red spots and fairly large trusses. It flowers late and is a good plant for this reason, but slow-growing.

Auriculatum Series

This series has only two species but both are highly desirable. *R. auriculatum* (B ** Hupeh) is a large shrub with sweet-scented, white flowers which come in August. It is a real acquisition not only because of its late flowering period but both its growth and foliage are very attractive. *R. Griersonianum* (D **** Yunnan) is a plant which has had a great influence on recent hybrids and appears to be much hardier than the rating indicates. Flowers are tubular at the base opening like large trumpets of bright geranium-scarlet. It is one of the outstanding of the newer species and well worth growing.

Azalca Series

The truly deciduous azaleas are too widely known to need Pacific Northwest comment and in the opinion of many they are not as generally used here as they deserve to be. Two from Japan however, *R. pentaphyllum* (C ***) and *R. quinquefolium* (B ****) may not be so widely known. *R. pentaphyllum* while attaining twenty-five feet in the wild has been rather slow-growing and after six years is only

about three feet high yet it flowers profusely each year with beautiful pink flowers which are about two and one-half inches in diameter and quite open but the texture of the flower is delicate and it does not last long. *R. quinquefolium* is reputed to be slow to flower when young and has certainly lived up to its reputation in my garden for after five years I have still to see a flower. Both of these species cannot be dismissed lightly, however, as they are rated highly and it will take further experience to determine their usefulness to us.

It is in the evergreen and so-called semi-evergreen group that the Pacific Northwest should assume a place of importance as a testing ground. At present the confusion of species, types, improved varieties of complicated hybrids, the mass of conflicting and often duplicate names appear to the average grower like an impenetrable jungle yet we feel certain that out of it will come a number of finer plants than those now in existence.

Already we have outstanding examples in some of the Japanese azaleas received prior to the war.

Without attempting scientific classification most of these may be placed in several general groups; Kurume, M x K (Malvatica crosses), Macrantha, *R. mucronatum*, Eriocarpum (a variety of *R. Simsii*), Macrandicum (apparently a cross between Macrantha hybrids and *R. indicum*) and Scabrum. In many of these the ancestry is so mixed that correct classification of plants is difficult if not impossible at the present time and their hardiness varies to a marked degree.

The Kurumes we are told were first introduced into the United States at the San Francisco fair of 1915, but were lost to commerce and reintroduced by Mr. E. H. Wilson of the Arnold Arboretum. This is a splendid

group but highly variable in hardiness. Some, like Benigiri, Hinodegiri, Snow, Hinomayo, have withstood our winter weather for a number of years but many others are on the "tender side" and until some controlled scientific study is made we will have to continue our method of trial and error.

M × K azaleas have been successfully grown in England for a number of years and include some splendid plants. Our difficulty is in securing the desirable varieties but those already grown have been hardy and excellent plants.

The *Macrantha* hybrids and clones all seem hardy and while their general form is twiggy and not usually considered as desirable as many others, they come in a beautiful variety of colors and most of them flower in June so they extend the flowering period over a time when few of this genus is in bloom.

R. mucronatum (usually sold as *Azalea ledifolia alba* and *ledifolia rosea*) can be rated from excellent to poor depending on the individual plant. The finer forms are among the most beautiful azaleas in existence therefore clonal varieties of known value should be selected. *Noordtium* (*Luikiu Azalea*) is among the best but there are many others.

The *Eriocarpum* group is best represented by *Azalea Gumpo* which is low-growing and has beautiful pure white, frilled flowers. In this group are others such as *Pink Gumpo*, *Red Gumpo*, and *Album giganteum*, the latter having flowers six inches across or so the catalog says. Mine has not flowered.

Little is known of the *Macrindicum* group as only a few arrived before the war but it should be good as many of them are known to stand considerable cold and they are unusually large.

The *Scabrum* group intrigues many of us as some are reputed to attain a height of twenty feet and while this group is usually rated "E" under English ratings, one variety, *Red Emperor*, has grown successfully in my garden for six years but I am beginning to suspect its parentage or is authenticity. It shows no sign of attaining great height and is a poor color. Only additional importations will prove the merit of this group.

Barbatum Series

This series seems slow to flower but includes some excellent species. *R. barbatum* (B **** India) grows from thirty to sixty feet in height and is a beautiful plant. The flower trusses are comparatively small but this is offset by the brilliancy of color. *R. strigillosum* (C *** China) is also outstanding. *R. pachytrichum* (C—China) has not proved worthy of growing from seed although there is a form in England which received an Award of Merit.

Boothii Series

This group has won considerable admiration among those who like low-growing and rock garden rhododendrons. *R. deleiense* (C *** India) and *R. tephropeplum* (C *** South-Eastern Tibet, China and Upper Burma) are similar; *R. deleiense* has a wider leaf and being slightly fragrant. Two splendid shrubs. For the rock garden *R. leucaspis* (C *** Tibet and Tsango Gorge) has a pure white open flower and beautiful hairy leaves, while *R. megeratum* (D * Yunnan and Upper Burma) is similar with bright yellow flowers.

Camelliaeflorum Series

I have grown a number of plants of *R. camelliaeflorum* (D — Himalaya) and while it is not rated as tender most of the small plants winterkilled. Sev-

eral survived and are about five feet high but have never flowered.

Campanulatum Series

All hardy and while not rated high for garden merit *R. campanulatum* (B ** Himalaya) is a most interesting foliage plant. The leaves have indumentum of rich brown that is lovely when the plants get large enough to display it. The upper surface is deep-green. Plants grown in the shade are more blue than those in the open.

Campylogynum Series

Here are two splendid plants. *R. myrtilloides* (A *** Northeastern Burma) with glossy foliage and small plum-purple flowers, is suitable for the rock garden and *R. campylogynum* (A ** Yunnan) is said to grow to six feet but seems to remain lower in our area.

Camtschaticum Series

Have seen only *R. camtschaticum* (A — Alaska). These plants were brought out of Alaska but seemed to resent moving and soon died.

Carolinianum Series

Better known in the East than on the West Coast but *R. carolinianum* (A—North Carolina and Eastern U. S.) as grown here is white to pink rather than rosy purple. It adapts itself readily to naturalistic plantings.

Cephalanthum Series

About a half dozen good plants of which *R. ledoides* (C *** Yunnan) and *R. sphaeranthum* (C *** Yunnan) are probably the favorites. They make excellent rockery plants with white to pink daphne-like flowers, slightly scented.

Cinnabarinum Series

A very unusual and interesting group. Have grown a number of *R.*

cinnabarinum (B **** Sikkim Himalayas) from seed and all are good but vary in leaf coloring and flowering time. This plant is said to grow only to six feet but several are somewhat taller.

Dauricum Series

Two species only, but one, *R. mucronulatum* (B **** Northeastern Asia and Japan) should be in every garden. Often mistaken for an azalea, it flowers early, about the time the forsythias bloom, has flowers before new leaves and is a bright mauve-pink.

Edgeworthii Series

R. bullatum (D **** Yunnan) is the only one I have succeeded in growing and this shows a tendency to die back a few inches in occasional years but it is well worth giving protection as it has large white, sweet-scented flowers and interesting, puckered, leathery leaves.

Falconeri Series

This large-leaf group should be grown wherever possible if only as a foliage plant for outside of the Grande Series there is nothing in the genus comparable to them. They look like something brought out of the tropical jungle and yet they are comparatively hardy. With protection from wind and winter sun mine have withstood temperatures of 12° without being cut or defoliated. *R. Falconeri* (C **** Himalayas) is considered the finest and grows to a tree of forty to fifty feet, with pale yellow flowers. *R. Hodgsonii* (B * Himalaya) has a longer, slightly narrower leaf and while it is said to have a poor flower it is still one of the best foliage plants I have grown. I believe the entire series is slow to flower as several plants fifteen years old have never produced a single flower bud.

Ferrugineum Series

Good rock plants and while not especially attractive have the advantage of being thoroughly hardy and flowering late. *R. ferrugineum* (A *) and *R. hirsutum* (A *) both come from the Alps.

Fortunci Series

Here are at least a dozen of the finest and most useful rhododendrons grown and they give promise of much wider usage than is now accorded them. Most are rated "B" and "C" for hardiness and different species flower at different times over a period of several months. Those of greatest merit in the hardier classifications are *R. calophytum* (B *** China), *R. sutchuenense* (B *** China), *R. discolor* (B **** China) and *R. orbiculare* (B *** China).

Fulvum Series

A small series and I have grown only one species, *R. fulvum* (B ** Yunnan). These plants are too small to evaluate but it is said they grow to about twenty feet and should be interesting woodland plants.

Glaucum Series

A series of which I have grown several species for a number of years and they have grown in my appreciation each year. This is one of the series which does not resemble the typical rhododendron. It has small leaves and flowers and an individual beauty hard to resist. *R. glaucum* (B ** Sikkim) and *R. pruniflorum* (C *** Northeastern Burma) are representatives of the series.

Grande Series

Definitely on the tender side but some more hardy than others. *R. sino-grande* (C **** Western Yunnan, Northeastern Burma and Southeastern Tibet) has the largest leaf of any plant

I have grown, sometimes measuring over twenty inches in length. It seems more tender than the smaller leaf species of the same rating and was defoliated at 12° but came back satisfactorily.

Heliolepis Series

R. rubiginosum (A *** Yunnan) and *R. desquamatum* (D ** Western Yunnan and Northern Burma) are the best of the series. *R. rubiginosum* is most widely grown and is extremely variable in color. Generally a lilac-rose, some plants are almost a clear pink. Very floriferous and a splendid plant at the edge of a wood or in a naturalistic planting where large colorful displays are desired. Eventually grows to thirty feet.

Irroratum Series

A comparatively large series with many species and sub-species only a few of which have been grown in the Pacific Northwest. *R. irroratum* (C ** Yunnan) is good but nothing special, however one plant (probably a "bee cross") varies from the true form and is one of the finest early pinks I have grown. This plant, now over nine feet in height, flowers profusely every March and withstands the stiff winds and rains of that period as no other plant I have seen. *R. Elliottii* (Kingdom Ward #7725, D **** Manipur, Japvo, Naga Hills) is a splendid crimson scarlet of good form and texture.

Lacteam Series

The one species which has flowered for me, *R. lacteam* (C **** Yunnan) unfortunately proved to be the white form which did not measure up to the rating of the clear yellow which is considered one of the best.

Lapponicum Series

One of the largest and most confus-

ing series. Some English authorities have said these might well be ignored except for perhaps a dozen species. I am heartily in accord with that statement for the differences are so minor, and many species are of even questionable merit that they have little or no garden value. But among them are some plants which every grower will prize, *R. cantabile* (A ****), *R. hippophacoides* (A ****), *R. russatum* (A ****) and *R. scintillans* (A ****) all from Yunnan are in this top bracket.

Lepidotum Series

A small shrubby series of which *R. imperator* (A *** Burma) is an outstanding gem and a splendid rock garden plant.

Maddenii Series

A large but somewhat tender series some of which should be grown wherever possible. Among the hardier ones worthy of mention are *R. ciliatum* (C *** Sikkim) Himalayas), a small spreading shrub which is widely grown and has blush to deep pink flowers; grows low in open locations but attains a height of six feet in shady ones; *R. Valentinianum* (D *** Yunnan), one of the best rock garden shrubs with lovely butter-yellow flowers; *R. crasum* (D *** Western Yunnan and Upper Burma), a large shrub or tree and highly desirable because of its fragrant white flowers which come in June and July. This I consider one of the top ranking rhododendrons.

Moupinense Series

Another small series with one of the finest low-growing species of the genus, *R. moupinense* (B *** Eastern Tibet and Szechuan). This plant flowers in February, is low-growing and splendid for a rockery.

Neriiflorum Series

One of the most important series

with a large number of excellent species and thoroughly hardy in our area. Mostly medium-sized shrubs but some splendid rock plants such as *R. Forrestii* (B **** Northwestern Yunnan and Southeastern Tibet) and *R. repens* (A **** same area) both somewhat difficult to grow but well worth the effort. Reds predominate in this series but there are several excellent ones in orange shades as well as rose and yellow. Many fine species.

Ovatum Series

All tender and to my knowledge none have been grown in this area.

Ponticum Series

Some good plants but nothing outstanding.

Saluenense Series

A group of dwarf shrubs to delight any rock gardener *R. calostrotum* (A *** Northeastern Burma), *R. keleticum* (A ** Southeastern Tibet), *R. radicans* (B **** Southeastern Tibet) and *R. saluenense* (A *** Northwestern Yunnan) are the best I have grown and I consider them among the most important of the dwarf shrubs.

Scabrifolium Series

A group of medium-sized shrubs with small leaves and flowers but very attractive in any naturalistic location. *R. pubescens* (B *** Szechuan) is probably the best and *R. spinuliferum* (C *** Yunnan) the most unusual. It looks like a flowering fire cracker.

Semibarbatum Series

Only one species and do not know of it being grown here.

Taliense Series

A large series but does not seem to possess sufficient merit for general use. A few fairly good garden plants.

Thomsonii Series

Certainly one of the top-ranking series containing many excellent species most of them thoroughly hardy. Have grown about twenty and not a bad one in the lot. In the Subseries *Campylocarpum*, *R. campylocarpum* (B **** India), yellow, and *R. callimorphum* (B *** Western Yunan), pink, are excellent. In Subseries *Souliei* one should grow at least six but I mention only three; *R. Williamsianum* (C **** Szechuan), a low-growing plant with pink flowers and heart-shaped leaves; *R. Souliei* (B **** Western Szechuan), a large shrub with white to rose-colored flowers and *R. Wardii* (C *** Western Yunnan), a splendid yellow. In the Subseries *Thomsonii*, *R. Thomsonii* (B **** India) and *R. Stewartianum* (C *** Upper Burma, Western Yunnan, Southeastern Tibet) are among the best.

Trichocladum Series

Have grown none. Ratings indicate few plants of merit.

Triflorum Series

This group I regret to report is not as widely grown as it deserves to be for it includes some of the most beautiful flowers in existence. Instead of the grandeur of large flower trusses and magnificent leaves these plants have a lace-like delicacy, a charm and grace of line which is seen only in nature's aristocrats. The flowers are more like an azalea, with long protruding stamens; the colors are soft and delicate. One should definitely grow *R. Augustinii* (C **** Western Hupeh and Szechuan) which comes in various shades from deep blue to light lavender blue; and *R. yunnanense* (B **** Yunnan) with white to pinkish and orchid-colored flowers dotted with red. This plant in a good form would be

classed in the top bracket of choice rhododendrons.

Vaccinioides Series

Have never seen one of this series in the Pacific Northwest probably because of the low ratings and tenderness.

Virgatum Series.

Three excellent low-growing shrubs of which *R. racemosum* (A **** Yunnan) is by far the most outstanding.

Explanation of ratings as given in parentheses after each species:

"A"—Hardy anywhere in the British Isles and may be planted in full exposure if desired.

"B"—Hardy anywhere in the British Isles but requires some shade to obtain best results.

"C"—Hardy along the seaboard and in warm gardens inland.

"D"—Hardy in south and west but requires shelter even in warm gardens inland.

Asterisks indicate merit, four (****) being the highest rating.—From the 1939 Yearbook of the Rhododendron Association (Great Britain).

HERBERT IHRIG.

University of Washington

Rhododendron Show

The first annual rhododendron show in the State of Washington was held in Seattle on May 4 and 5 in the University of Washington Arboretum. It was sponsored jointly by the University and the Arboretum Foundation, founder of the Arboretum, and its representative in civic undertakings. It is, of course, generally known among gardeners and horticulturists that nowhere in the world can rhododendrons in all their varieties be better grown than here, and in few places can they be equalled, with the climatic conditions prevailing in the coastal region of Washington, Oregon, and British Columbia. There has been an almost spontaneous movement toward the use of rhododendrons in the gardens in the Northwest in the last few years which

the continued emphasis of the University of Washington Arboretum and the American Rhododendron Society have had a large part in. Many amateur growers have imported the choice English hybrids for their own gardens and have generously allowed their friends among the nurserymen to propagate from them, so that such varieties as Mrs. G. W. Leak, Unknown Warrior, Loder's King George, Unique and many others are becoming as much used as the old Catawbiense was in the 1910's and bid fair to run it out to less favorable climes.

The emphasis in the Arboretum has been on rhododendrons and azaleas and with the view of interesting a greater number of people in the Arboretum and its fine collection of rhododendrons, the Show was planned in a natural setting of the Arboretum adjoining Rhododendron Glen. This Glen is a nine-acre tract winding down a stream-bed along hillside shaded by western dogwoods (*Cornus Nuttalli*) and with a background of native Douglas firs and western hemlocks. In it over a period of years have been planted upwards of 250 varieties of rhododendrons, both species and hybrids. It was full of bloom at the time of the Rhododendron Show and was a fitting prelude for the spectacular exhibition in the tent at its summit.

Believing that the Show had a value artistically as well as horticulturally, an effort was made to stage it as beautifully as possible, and the resulting interest on the part of the general public (which in the Northwest is always the gardening public) was evidence of the soundness of this theory. The plants exhibited were sunk in sawdust and peat to a depth of 12 inches so that they seemed actually planted in groups as they would be in a garden. The ease with which they could be kept damp in this way was also important. In the

same way, the cut blooms were kept fresh in deep receptacles so that at the end of the Show they were with almost no exception as fresh as when they were brought in. Pint, quart, and two-quart fruit jars painted an olive green on the outside were used and were most practical and inconspicuous. The tent was a soft green color and table coverings and facings and backgrounds were carried out in the same tones. One side of the tent opened onto a bank covered with blooming azaleas with rustic steps leading down from it to the axis of the Show tent centerpiece. This was a small stone garden figure of a chubby boy which was raised to eye height and banked at the base with azaleas at the level of the tables for the cut blooms.

Three thousand persons attended the Show at a paid admission of sixty-five cents. Information was sought at every step of their pilgrimage through the Show and the inquiries already received by the Arboretum and nurserymen indicates the success of the undertaking.

From the horticultural standpoint, a high standard was set and there were few exhibits which would not have stood out in any surroundings. Eighty-three different varieties were exhibited—twenty varieties of species rhododendrons, fifty varieties of hybrid rhododendrons, thirteen varieties of azaleas. The bloom adjudged finest among the cut trusses was Lady Chamberlain. It is a direct importation of Mr. Donald G. Graham of Seattle who has recently returned from England where he was stationed during the War. Its rare beauty allowed of no conflict of opinion among the judges. It is a *neriiflorum* hybrid of a tawny chamois golden pink—which description would immediately be questioned for accuracy by anyone who has seen it, for it defies description. The perfection of form and

foliage even in a single bloom is outstanding and on the plant itself hanging its trumpets among the dark green leaves, it must of necessity be coveted by every gardener. As a direct contrast to its delicacy, Loder's King George exhibited by Ralph DeClements of Bremerton, also an amateur grower of distinction, towered above the heads of crowd in the tent with its tremendous flowers perfection itself. This plant received the award for the finest plant in the Show and again no one could question the judges' choice.

In spite of the fact that the Show was a little early for the season, and that the schedule did not entirely fit in with the needs of the locale, the list of exhibits is very impressive. With a later date set for next year and almost twice as much space planned for, we do not doubt that we shall have an even more imposing list. There were two unnamed hybrids exhibited and we hope to encourage growers in this field through the stimulus of the Show.

The list of varieties shown follows:

Species

Augustinii, *campylocarpum*, *calostrotum*, *californicum*, *carolinianum*, *decorum*, *Davidsonianum*, *didymum*, *exquisitum*, *fastigiatum*, *Fortunei*, *glaucum*, *Griersonianum*, *impeditum*, *nerii-florum*, *oreotrephe*, *sinogrande*, *Thomsonii*, *tephrocephalum*, *yunnanense*.

Azaleas

Types and unnamed varieties of:

Altaclarensis, *ledifolium*, *mollis*, *occidentalis*, *Vaseyii*, *Albrechti*, *indicum balsaminaeflorum*, and the hybrids, *Ruby*, *Apple Blossom*, *Peach Blow*, *Laughing Water*, *Christmas Cheer*, and *Snow*.

Hybrid Rhododendrons

Alice**, Bagshot Ruby*, Butterfly**, Beauty of Littleworth, Bow Bells*, C. B. Van Ness, Corona*, Corry Koster, Cunningham's White, Cynthia*, Cynthia Improved*, Earl of Athlone**, Elspeth Slocock, Fabia*, Faggetter's Favorite, Garnet*, Griersonianum hybrid*, Griersonianum × Elliottii*, Lady Chamberlain, Lady Primrose*, Lady Rosebery, Loderi*, Loderi King George, Loder's White, Luscombeii**, Mrs. C. B. Van Ness*, Mrs. Furnival, Mrs. G. W. Leak**, Mme. Wagner, Purple Splendor*, Richard Gill*, Rosamund Millais, Rothschild's Hybrid, Smithii Aureum*, Susan, Tallyho*, Tester Van Dyer*, The Hon. Joyce Montagu, Unnamed hybrid (2), Unique**, Van Ness Sensation**.

Exhibited by the Arboretum

Eureka Maid, Gomer Waterer, Lady Bessborough, Mrs. W. C. Slocock, Pink Pearl, Van Weerden Paelman, Souvenir W. C. Slocock, White Pearl.

MRS. ARTHUR J. KRAUSS.
Seattle, Wash.

Azaleas in Ohio

I received your letter asking me to give my experience with azaleas. I should have answered your letter sooner but I know there was little I could give that would be information except to those few who are situated as I am in the heart of a great limestone section. With cement factories near and limestone quarries for miles around and great deposits of Lower Silurian limestone shale, it does not make a very promising picture for any one who is interested in sour soil plants and wants to grow some of them.

* Commercial exhibit.

** Both Commercial and Amateurs exhibited.
No stars—Amateur exhibit.

There is always a desire to grow something unusual and at the same time something that everyone around you does not have, and azaleas are just that.

I have a bed of azaleas about sixteen feet long and four feet wide. I excavated two and one half feet deep, threw out the top soil to itself, and sifted the top soil with one quarter inch mesh screen to get out any limestone pebbles that might be in it. I filled in the bottom of the excavation with brush and leaves and filled in some good top soil mixed with sand and peat moss, as I neared the ground level, adding a little more sand and peat moss building the bed four inches above the level, by adding oak leaves and peat moss each fall it is six inches above level. The advice to add a heavy coat of oak leaves each fall and leave them on to rot up would in time make the bed entirely too high.

My bed is seven years old, and as I started with rooted cuttings purchased from an Eastern nursery, what few lived are not very large. I tried several years with the rooted cuttings but found I was getting nowhere with them. We are in the interior of the country where the latter part of summer gets very hot and dry, and at that time the cisterns of rain water get very low, just at the critical time when azaleas need most watering, so most of the rooted cuttings would perish. I have switched to larger B. & B. plants and plant them in the fall. My bed is now full of very nice plants. The rooted cuttings would have been all right, no doubt, if I had been in a location with much moisture in the air as near the coast or in the mountains.

Another thing that is against us here is that we are about at the most northern limit of the belt where azaleas can be grown. This necessitates a careful selection of kinds. I find certain kinds

listed as hardy will just not do here; Cleopatra is one, a Kaempferi Hybrid. These hybrids are said to be the hardiest of the evergreen class. I tried several and they all winter killed. I have what I bought for Atalanta, which is listed as purple, a Kaempferi hybrid evergreen, but my plant is evergreen and has beautiful large pink flowers, more desirable than any purple would be. Hinodegiri has not proven too hardy with me. I lost several but now have one that went through last winter nicely. I like the color of the one I now have. They apparently vary much in color as one I had was a dirty brick red. I found the plants I bought from the extreme southern states were not hardy here. The same varieties from northern nurseries went through winter with no winter damage. I have Amoena, Amoena Coccinea, Flame, of the Kurume azaleas, these with J. T. Lovett and Maxwellii, are doing nicely. I have Hexe but do not know what it intends to do. It was planted late last fall and does not look any too well. Maxwellii froze back some on the west side of the bush, but with the excessive rains we have been having it is making good growth. Most azaleas are making wonderful growth; the constant rains seem to be what they need.

Altaclarensis and one of our native azaleas have new growth about a foot long and this is just June first. If they keep up this growth it will not be long until they will be a solid mat. I am afraid I have them planted too close but by the pictures I see of azalea plantings they form a solid bed.

I am trying out one of Gable's hardy azalea, Elizabeth Gable, listed as rose pink, but the one I have is hose-in-hose and the same color or shade of Mossiana (listed as purple). I have Mossiana and Cardinalis of the Arnoldiana group; both are evergreen.

Mucronulata blooms in late March with me and has the rankest growth of all, but last spring a year ago it was in full bloom when a severe freeze almost killed it. It is making some growth this year and I think it will recover. I grew it from a cutting and it was four feet high. *Poukhanensis*, or what I have been growing for it, was not near so far along that spring and bloomed nicely and was in no way hurt by the freeze. It is listed as deciduous and fragrant and rose purple. My plant is about evergreen, flowers orchid and not fragrant. It is second to bloom of the azaleas I have; then Flame, Mossiana, Amoena, Cardinalis and Hinodegiri follow it, with Atalanta, Ledifolia alba and Elizabeth Gable last.

My Schlippenbachii did not bloom this year. It was set last fall but it looks as if it is forming buds now. I am not acquainted with it so it may turn out to be leaf growth. I have two *Rhododendron catawbiense* in the bed; the flowers are lavender; I had hoped they would be red purple.

I read of planting sour soil plants under the taller azaleas, but I find the better sour soil plants will not stand the azalea fertilizer. I had nice arbutus and orchids in the bed and when the commercial sour soil fertilizer got near them all died out. I have had no trouble resetting arbutus from the wild if they are watered well with a strong B-1 solution. I received plants from North Carolina from the wild, that were so dry on arrival I had considered them past growing. I soaked them for four hours in B-1 solution (strong) and planted them and watered with the solution they were soaked in and all grew and bloomed the next year. Partridge berry and Foam flower do not mind strong fertilizer.

W. N. LEIGHTY.

Germanstown, Ohio.

Loiseleuria procumbens

This dwarf relative of the azaleas presents a challenge away from its mountain home. It can be grown, however, and when planted with other dwarf shrubs in a proper setting exerts its subtle charm. Here in northwestern Connecticut two plants of *Loiseleuria procumbens* have been growing for two years but have failed to flower. One plant which may be of the more vigorous European variety, has put on excellent annual growth with sprawling stems reaching out about six inches from the central tuft, and this year each of these stems has put on a crown of new shoots about four inches long. When these are pegged down they should make a neat clumpy new plant to attempt in another location to try to induce flowering.

The other plant, collected in the White Mountains, has not shown such vigor but maintains a dense tufted growth.

These plants are growing at the foot of a north slope in gravelly soil to which was added a generous supply of old rotted peat. The area is shaded by fairly tall Douglas fir trees which allow the sun to reach the plants only as it slants down the hill in the afternoon.

When new propagations are ready to be set out they will be tried in a nearby location which has the same type of gravelly acid soil but is in full sunlight, tempered somewhat by sloping to the north. In this location heaths and heathers have done remarkably well and suggest further experiment with related plants.

H. LINCOLN FOSTER.

Norfolk, Conn.

Overwintering Dormant Seedlings

Contrary to common advice, we occasionally experience success acting in desperation. Such was the happy out-

come of storing flats of rhododendron seedlings in a cool garage. Seed of rhododendron and azalea species arrived late in the spring of 1945. Though germination was satisfactory, growth was very slow in a shaded greenhouse. Transplanted seedlings seemed to stand still, which, with the press of other business, discouraged further transplanting; so a majority of the plants were left in the original seed flats, crowded as they were.

These were kept in the greenhouse until the heat was turned on in the fall. Then arose the question of how to handle the tiny plants. The outdoor frames, which were full of transplanted azaleas and rhododendrons, were in such poor repair that nothing would make them mouse-proof. A sad experience the winter before had proved the partiality of mice for most species of ericaceous plants. (*Rhododendron mucronulatum* they apparently find unappetizing.)

In desperation, the flats of seedlings were moved into a two-car garage. This room has five windows, three on the north and two on the east. Heat pipes for an apartment above run along the ceiling, but with the wide doors facing north the room is not warm in severe weather. The temperature at table height on occasion reached 20° F.

The flats were kept on the dry side with only occasional watering during warm spells. All of the seedlings remained evergreen, including *Rhododendron obtusum* var. *kaempferi* and $\times$ *arnoldiana*, *mucronulatum*, *viscosum*, *ledifolium*, $\times$ *gandavense*, *roseum* and *pennsylvanicum*.

As the days began to lengthen in February there were signs of new life, especially in *Rhododendron mucronulatum*, so all were brought into the greenhouse. Those that were crowded in their original seed flats were transplanted. *Mucronulatum*, *ledifolium*,

$\times$ *arnoldiana*, *kaempferi*, and *viscosum* responded immediately and by May had put on wonderful new growth, demanding a second transplanting. Similarly *Ledum groenlandicum*, *Pieris japonica*, *Rhododendron occidentale* and *atlanticum*, all of which, sown earlier, were good size by fall, but had been brought in for safety's sake, went right into strong new growth.

Rhododendron viscosum, $\times$ *gandavense*, *roseum* and *pennsylvanicum* did not take so kindly to the treatment and sulked for a long time before deciding to take up growing again. These sulkers had all been transplanted the summer before when very small and had made poor growth, which may explain their sluggishness.

The fine response of the others seems to indicate that such storage has definite possibilities for rhododendron in their tender youth.

H. LINCOLN FOSTER.

Norfolk, Conn.

Azalea, Hazel Dawson (See page 379)

Although many a person has seen this excellent azalea in my garden I have never known one of them to order one from the nursery! This is a puzzle for the plant is vigorous, erect growing, winter hardy, semi-evergreen and in mid-season covered with large rosy purple flowers. These are particularly fine as the very base of the corolla in the section known as the tube, the color is almost pure scarlet and when the sun shines through the flower, this inner warmth makes a fine color for all except the traditionally conditioned-against-purple-people, whose tribe fortunately is dying out. Like all azaleas of its kind, it comes easily from cuttings and will make excellent layers, if you are too lazy to make a cutting.

On the chance that there might be records of its parentage, a letter was

sent to the Eastern Nurseries in 1945 and Miss Hodgson very kindly replied in part:

"... I am only too pleased to give you what information I have regarding *Azalea Hazel Dawson*, which I am sorry to say is quite limited.

"*Azalea Hazel Dawson* is a Dawson hybrid. It is a cross between *A. Kaempferi* and *A. ledifolia*, and is lilac mauve in color. 'Silver Medal.'

"I have checked through our old catalogues and find that it was first listed in 1923, which is about 8 years after the death of Jackson T. Dawson. Therefore, on that assumption I think the hybridist was the late Henry Sargent Dawson, rather than the father. However, I may be mistaken as to the originator, but if it was introduced by the late Jackson T. Dawson, feel confident that there would be a record of it in the library at Horticulture, Horticulture Hall, Boston."

Several other inquiries brought no further light on the azalea. The cross seems quite in order for it is one that most of us have made. None of my own hybrids approach this one and none that I have seen come up to it in color though one by Mr. Yerkes, is as large, though much paler.

Hybrid azalea, Mai-hume. (See frontispiece)

The accompanying photograph is given, not because this clone is outstanding above all its fellows, but because it shows as well as any other the type of flower variation that may come on one clone. The variants seem to be fairly uniform on each shoot so that if one takes cuttings from a definite shoot, the resulting plant will appear to have only one sort of flower, until some fine day it decides to sport and give you one or another of the variants possible.

The upper right hand flower shows the typical deep rose red bloom which represents one extreme; the lower right flower, shows the other, a faintly tinted white with only a little flecking of color in the "blotch." The upper left shows an intermediate pale pink with one lobe and a part of a second, the deep rose color of the right hand flower. The lower left, shows the same sort of pale pink flower but with a heavy blotch of colored dots in the proper area. It shows also a tendency towards whiteness on the edges of the lobes which is a familiar color pattern in many of the "Indian" azaleas. One can foresee any amount of trouble for the nurseryman who will have to receive queries from customers who may get quite different looking plants from the same name clone.

In Dr. Bower's *Rhododendrons and Azaleas* (p. 224) in his preliminary discussion of the section *Tsutsuji* there is a paragraph; "Yellow flower color does not occur in the subseries. The flowers are characterized by typical anthocyanin pigmentation, running through the delicate pinks to rose, crimson and lilac colors. White forms are relatively abundant. Marking in the forms of spots or blotches are common. Chimeras occur as flakes and segments in the Indian azaleas." This would explain the conditions in the flower on the upper left, but perhaps not all the rest. Indeed the present writer feels that there is much more to be said in the matter of flower patterns and their inheritance and it would be his preliminary opinion that while chimeras which produce sectional colorations are all very well, that flaking as such has been inherited in too many cases to be looked upon as such a successful chimera!

But whatever the explanation that may evolve or the doctor's degrees that



Robert L. Taylor

Azalea, Hazel Dawson

[See page 377]

may later be earned in the investigation of the behavior of certain azalea patterns, the plants themselves are lovely things and well worth the attention that

has been lavished on them through the years by gardeners in every part of the world.

Takoma Park, Md.

Narcissus Notes

B. Y. MORRISON, *Editor*

Daffodils in 1946, Dallas, Texas

To a certain extent, conditions for daffodil bloom this season appeared not so favorable, in that many established clumps failed to show buds and others came blind. While in a measure disappointing, on the whole this may have been as well, since the writer had more time for individual observation and study.

The following notes are principally devoted to some of the recent additions to my collection. Several are from New Zealand or Australia, by way of the American Northwest, some from Michigan and some from Maryland. In none was there an appreciable difference in performance—perhaps only slightly larger bulbs from the Northwest. All were true to name and as described.

Surprisingly, La Argentina, a Poetaz, bloomed first of all and abundantly. At the close of the season, this produced a second time, normally. All were fine blooms.

Silver Chimes, a Triandus and Poetaz cross, normally a late bloomer, was next, with two scapes to each of six bulbs, bearing from four to eight florrets of pearly whiteness on scapes of unusual height, with long-lasting flowers. A treasure this, in any collection of daffodils.

As for the New Zealanders or Australians, of which there are a few:

(1) Shirley Wyness (4a) was eagerly watched for the promised "pink

cup"; my fingers were crossed to be sure, but when it came into bloom—a tall, vigorous looking plant with sturdy stem—I was satisfied. The crown was truly "pink" by the second morning.

(2) Margaret Fell (2b) has a fine white perianth with yellow crown, bordered with orange red. A tall and beautiful flower which withstood wind and rain better than many shorter ones.

(3) Melva Fell (2b) another very beautiful white flower with a band of red, not quite as tall. My notes say "an exquisite flower."

(4) Margaret and Melva are more delicately beautiful, but David West (4a), a midseason bloomer of unusual charm, would probably hold the greatest appeal for the *size enthusiast*. This, with its finely imbricated cup of cream gradually becoming pure white, with buff-cream shading, would likely become first choice. One stands and looks—in doubt; he looks again and again to decide at least that David West is a *must*. Rightly or no, size has again scored.

Polindra (2b) might easily be considered as fine a Bicolor Incomparabilis as one could wish to see and possess. Its perianth is broad, flat, pure white and of fine substance. The crown, clear yellow and serrated at the mouth, completes an altogether magnificent flower of commanding height and size.

Looking across Polindra and seeing St. Egwin (3a), a splendid Barrii of

clear soft yellow, of great height and finely proportioned segments, one stands amazed at the skill of the originator of these masterpieces. St. Egwin is majestic in its golden radiance.

Rustum Pasha (2a)—tall and a striking bit of color for this climate; said to be sunproof. Apparently a good doer, since in each of two positions—full sun and semi-shade—it did not lose its bright color.

Effective, a Bicolor with slender trumpet of gold which extends into the perianth, forming a halo of the same color. A beautiful flower and apparently a good garden subject.

Adler (2b) is a never failing joy in late afternoon particularly. Its large flat, white perianth and cup of yellow seem to absorb something from the light which softens the texture of the whole, making it a most lovely flower. A good grower and prolific bloomer.

Greeting, an *Incomparabilis*, not to be overlooked. This is not an overly tall daffodil, but one of breathtaking beauty with its large symmetrical flower of white—smooth as Carrara marble, with a perfectly flat perianth. When a day or so old, the perianth slightly reflexes, after the manner of Folly. A rare addition to any collection.

Last of all is a precious small thing, Acolyte, which gives an impression of Triandus blood. A late bloomer of charm and appeal to critical observers that can surely take a place along with that other small beauty, Beryl.

MRS. WILLIAM H. BENNERS.

Daffodils in New Hampshire

It isn't very profitable to try to raise haphazard daffodil seedlings, except as a matter of satisfying one's curiosity. There is a chance, but it is a very small chance, that a marvel may appear in a group of casual seedlings. In all

likelihood, however, there will be nothing as fine as many varieties already in the market.

Still, it is rather fun to plant a few seeds occasionally to see what will develop and I was pleased to see two very fair yellow trumpets among a few seedlings this year, for yellow trumpeters are decidedly in the minority in my garden. I had thought that Aerolite was thoroughly dependable but it didn't appear at all in the spring of 1945. At present King of the North, Sulphur Prince, Dawson City and Yukon are doing well, and there is an occasional flower from several others but they cannot be said to be dependable.

Except for these and some of the miniature species, several of which never appeared above ground at all, all hardy daffodils seem to like our conditions. There will be, of course, an occasional variety that will sulk, as for instance Mrs. Ernst H. Krelage, with which I never had any success while Beersheba, Kantara and several others have flourished exceedingly. I still hope to have some of the newer whites some day.

I had always thought Kantara a trifle short-stemmed for the size of the flower but this year the stems were tall enough and a clump of 50 or more of the great white flowers was a sight to see, even if the individual blooms did not have Beersheba's smoothness.

In spite of extremes of temperature, several people here have had fair success with old Double White, but in every instance with which I am acquainted the bulbs are planted in situations where the soil never dries out completely.

Daphne is supposed to be more dependable. It is an attractive little flower very white, except if I remember rightly, for a slight touch of yellow at the base of the petals. It is not so

double as *alba plena odorata* and is smaller and slighter in its whole effect.

A neighbor brought me four flowers from one clump that showed doubling in an interesting way. One had two poeticus crowns set one upon the other, and a few extra segments in the perianth. Two had the two crowns and extra segments from the center grew in different arrangements, petaloid parts. In the fourth, one crown was still visible, but the flower approached *alba plena odorata* much more nearly in the number of perianth segments.

RACHEL CAUGHEY,
Antrim, N. H.

Postscript from the Tulsa Exhibit

An arrangement of *Lovenest* and *Prunus pissardii* in an upright Chinese (brown) bronze container.

An arrangement of masses of *Orange Queen* and the foliage of *barberry* and *Photinia serrulata* in an oblong copper container.

An arrangement of *White Lady* and own foliage to imitate a clump in a green Celadon container.

An arrangement of *gracilis* var. *tennoir* with own foliage in white Peking glass.

A crescent shaped arrangement of wild currant, *St. Egwin* and a few yellow incomp with red rims to emphasize the red rims of the currant blossoms in a pale green, gondola shaped container.

An arrangement of *forsythia* bending sharply to the right with masses of *Jonquilla simplex* to the left and above in an oval aquamarine bowl. The material was combined because of the similarity of shape of the daffodil blooms and *forsythia* blooms. The design was suggested by a garden scene near a small *forsythia* during a high wind.

· Arching stems of *Spirea prunifolia*

var. *flore plena* combined with snow-flakes, an unknown white tazetta and green and white foliage of a saxifrage in an oval white container.

An arrangement of peach colored flowering quince and white daffodils in a flat grey bowl with a peach lining.

An arrangement of white daffodils suitable for a dining room table in a diamond shaped container with a green lining.

An arrangement of purple and green Lenten roses with foliage of *Euonymus japonica* in a purple container.

An arrangement of *Tulipa clusiana* and red bud in a pale green container.

ELEANOR HILL

Daffodils in Virginia

Among the pleasant recollections of my childhood is one of gay daffodils against an old gray fence with lilacs nearby. That was perhaps why, when there was a chance for a garden of my own, it was planned with a narrow border just for daffodils against a split-rail hickory fence with lilacs, purple and white in the background.

My first treasures planted there were the old varieties given by friends from their gardens or gotten from deserted places, the double *Von Sion*, *Butter and Eggs*, *Codlins and Cream*, *alba plena odorata*, *Early Virginia*, the white *Swan's Neck*, an unknown *Incomparabilis*, the *Poet's narcissus*, a creamy flowered *Tazetta*, *Campernelle* and *biflorus*. All of these with the exception of the *Tazetta* and *alba plena odorata*, which has never bloomed, liked their new home and they or their offspring have bloomed there for twenty-five years. It is true that in some years, this being one, they have shown a tendency to sulk, quarters having become too crowded or perhaps food too scanty, and bloom was scattering.

Our home is in the woods so in or-



Robert L. Taylor

Narcissus, Mary Copeland

[See page 384]

der to get the sun, we made the garden on its edge, open to the East and South. The trees on the other side are twenty-

five yards away and branched high. The four middle beds of the garden, 18 by 30 feet each, are planted with mixed

perennials and annuals and here, as they were added, the newer varieties of narcissus were placed, just back of the edging of thyme, verbenas, pinks and nepeta. At planting time phosphate was worked into the soil under the bulbs and another application given after the blooming season. In addition they got the benefit of a rich compost twice a year.

The iris did not seem to like such mixed company. They tried to monopolize the borders and another spot had to be found for them. Outside the garden, on the west nearer the house the woods are rather open with only a few large trees and some dogwoods and gradually the overflow iris were planted there where they and I fancied they could have undisputed possession.

Of course daffodils increase also and soon they, too, needed a new place. A few were planted among the iris as I told myself consolingly, 'the foliage will die before the iris bloom.' It did no such thing, but during the past season nowhere was the bloom of narcissus so profuse or the cups so brilliant. There, in addition to the phosphate, ground limestone is scattered every few years and wood ashes each spring. Now more bulbs have been dug in back of an edging of blue and white *Iris tectorum* under whose drooping leaves their dying foliage can be hidden.

The Poet's narcissus and some others, notably White Nile, Mystic, Silver Salver and John Evelyn had not done well in the 'sunny garden' and they along with Mrs. Backhouse, Beersheba, in fact all the white trumpets, were moved to a semi-shaded border that edges a grass plot on the west side of the house. With the exception of Evelyn who likes nothing done for him, and though increasing refuses to bloom, all did well.

Again when moving day came around, the poeticus and tazetta were transferred to the wild flower section in the woods outside the grass plot where under mountain laurel and other native shrubs they have shown greater increase than ever before.

Hereafter, since I cannot bring myself to throw away a bulb, the increase will have to go there, and it will be a case of the survival of the fittest in the shade. Yet, perhaps not. It may be that until the end of time I shall be ever searching for just the spot that each variety likes best, knowing that the effort required will be but a small price to pay for the joy their spring sunniness gives.

GRACE LEAR YOUNG.

Hebron, Va.

Narcissus, Mary Copeland (See page 383)

From the beginning of gardening, it is probable that there have been two schools of thought in regard to double flowers. By the mere process of eavesdropping, one is often able to catch an opinion that might not have been given in answer to a direct question. In daffodil shows, therefore, the editor has listened in on the fulminations of those who are against doubles as well as the arguments of those who like them. The delicate line of preference seems to be as to whether the essential form of the flower is destroyed or not and even those who admit a liking for doubles seem to prefer the variety in which the basic pattern is not lost.

For all such one may recommend Mary Copeland, which has an almost camellia-like form. For purest coloring in the vestiges of the cup, one must have sufficient moisture and a slow season. The blooming period is late.

Lily Notes

G. L. SLATE, *Editor*

*The Protection of Lilies Against Damping Off**

Damping-off of lily seedlings is often severe, the disease sometimes killing most of them if no attempt is made to protect them. George L. Slate in his "Lilies for American Gardens" suggests that the surface of the soil be well dusted with copper carbonate before seedlings emerge or about two weeks after seeding. He is speaking, of course, of those species which germinate promptly and send up a cotyledon soon followed by a true leaf.

But copper carbonate is known to be less effective against damping-off caused by the fungus *Rhizoctonia* than by that caused by *Pythium* and but little use is now made of copper carbonate for the similar protection of other plants. They are more often protected by seed or soil treatments with other fungicides, including some relatively new organic materials. Examples of such are Phygon (2, 3-dichloro 1, 4-naphthoquinone), Spergon (tetrachloro-parabenzoquinone), Fermate (ferric dimethyldithiocarbamate), Thiosan and Arasan (tetramethylthiuramdisulfide, with and without a wetting agent).

The writer has recently compared some old and new methods, using the regal lily, *Lilium regale* E. H. Wilson, as a test plant. Seeds if treated were sown in untreated soil, a sandy loam, and untreated seeds were sown in treated soil. Seeds were sown in a greenhouse in early January.

Post emergence damping-off was not severe, pre-emergence damping-off, be-

ing more important under the prevailing conditions. Results are expressed as relative numbers of plants which lived, the same numbers of seeds having been sown with all treatments.

Final stands were more improved by certain seed treatments than by any soil treatment. Best results were given by seed treatment with Thiosan, Semesan and Arasan, with the numbers of plants which lived increased as, compared to the check, by 37, 25 and 22 per cent respectively. None of these treatments retarded growth, and green weights per plant four months after seeding were greater by 8 or 13 per cent with Thiosan or Arasan than in the check.

Seed treatments with Fermate, Spergon, Phygon, Phygon-talc (1:1) and red copper oxide were all less effective or failed to improve stands and plants grown from seeds treated with Phygon and red copper oxide were smaller, weighed less by 44 or 55 per cent, than those in the check.

Treated seeds carried as much of the fungicide as would adhere after they had been shaken in a covered jar with the chemical, the excess of the latter being then removed by screening. Some of the fungicides may thus have been applied too heavily and to the detriment of germination or growth. But the indications were all in favor of Thiosan, Arasan or Semesan, especially the two former, applied in this way to seeds.

Soil treatments, the chemicals worked into soil just before seeding, included potassium dichromate 0.4 gm. (per square foot in all cases), sodium nitrite 3.0 gm., salicylic acid 7.0 gm. and

*Massachusetts Agricultural Experiment Station
Contribution No. 606.

Fermate 0.8 gm. Other treatments compared were formaldehyde one teaspoonful per gallon of water, one quart per square foot, or vinegar 215 cc. in one quart of water per square foot of soil applied immediately after seeding.

None of these soil treatments resulted in improved stands of seedlings and vinegar, potassium dichromate and salicylic acid had an unfavorable effect on germination or subsequent growth. Fermate was no more effective than it was as a seed treatment. Green weights were increased 30 per cent by formaldehyde but numbers of plants which lived were not affected. Copper carbonate applied to the soil two weeks after seeding failed to improve stands, probably partly because that is too late to prevent all pre-emergence damping-off. Growth of plants was improved by sodium nitrite but 15 per cent fewer plants lived with it than without it.

In one case, using the method of Dunlap (Conn. Agr. Expt. Sta. Bul. 380), seeds were sowed in sand which had been washed with hot water. Potassium nitrate, 2.5 gm. in one pint of water per square foot, was applied to it immediately after seeding. Final stands were less good than those obtained with treated seeds sown in soil and the seedlings, remaining too long in the sand, were much smaller than those in soil.

Seeds were also sowed on a one-inch layer of screened sphagnum moss over

a foundation of soil, a method suggested by Stoutmeyer and co-workers (U.S.D.A. Leaflet No. 243). An application of potassium nitrate and superphosphate, one teaspoonful of each in one gallon of water, was made immediately after seeding. Numbers of plants which lived were no greater than in the check. But this method resulted in the largest plants, green weights per plant four months after seeding being 67 per cent greater than in soil without sphagnum and without added nutrients.

It is possible that quite different results would have been obtained had the writer used seeds of a species such as *Lilium auratum*, the seedlings of which make no above-ground growth until the second spring. But the indications were that to prevent damping-off of species such as *L. regale* which make leaf growth the first season, seeds should be treated with Thiosan or Arasan, i.e., tetramethylthiuramdisulfide.

CORRECTION: LILIES FROM SEED

In the January 1946 issue of the magazine, on page 73, there was omitted one entire line from Dr. Slate's article. If you will be good enough to insert in the left hand column, after the word *soil* in the 30th line from the top of the page the following: "Mice sometimes raid the flats and destroy many bulbs during the winter."

Cactus and Succulents

W. TAYLOR MARSHALL, *Editor*

My Stay-at-Home Friends

In the last fifteen years about 1,200 friends have visited me and of these 1,100 liked my home so well that they stayed with me and I can visit with them daily. Others did not like the climate of Los Angeles and departed but they are still at home in Arizona, Mexico, Central and South America and the West Indies and I can visit them in their homes to renew old acquaintance.

Just about this time each year the urge to visit these friends returns and this year I decided to spend some time with my stay-at-home friends in Arizona. My trip covered the north rim of the Grand Canyon, the Hopi, and Laguna Indian villages, the Painted Desert, the Navajo country, the Petrified Forest, White Mountains and Salt River Canyon and Valley.

The first "stay-at-home" I encountered was *Echinocereus mojavensis* Eng. who had donned a vivid cloak of bright red flowers for my visit. This small cactus is found on the Mojave and Colorado Deserts of California and in northern Arizona where it merges into *Echinocereus coccineus*, which differs from the first species only in its more numerous heads and more contorted spines, and finally in the Petrified Forest into *Echinocereus triglochidiatus* Eng. which there exactly resembles the first two except that it lacks a central spine. Flowers on all species are identical.

These species, or rather this variable species, is most attractive as seen in its dry habitat but does not take kindly to cultivation. It is possible that its theme song may be "Don't fence

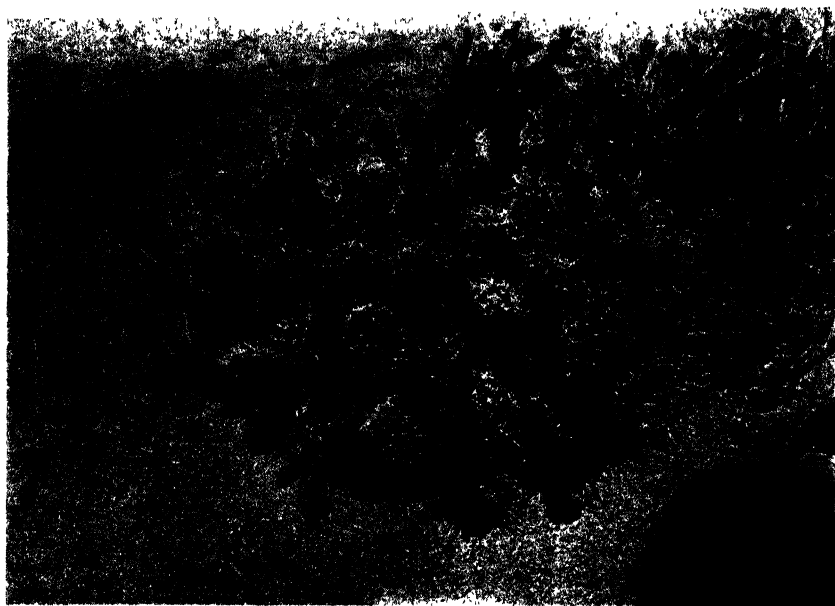
me in." It, and the other species mentioned in this article are to be enjoyed only in their habitats, well repaying a visit but intolerant of transplanting.

Ferocactus Wislizenii, one of the barrel cacti, next attracts our attention. At home in Arizona, New Mexico, Texas and northern Mexico it is an outstanding feature of the desert lands it inhabits, providing the traveler with his direction and, in dire emergency with water; direction because the head of the plant inclines to the southwest and water, speaking loosely, because when the top on the plant is removed, and the pulp crushed a quantity of saline, mucilaginous, not too palatable juice is obtained which is capable of sustaining life in emergencies.

There are about 25 species of barrel cacti only six or eight of which take kindly to cultivation and these we will discuss in a later article. It can be assumed that plants from a strictly desert region will not reestablish in a garden though sometimes they will live without rerooting, on stored food, for from three to five years.

The Giant Cactus, *Carnegiea gigantea* (Eng.) B. & R., is another plant to be visited in its home but unsuited to cultivation. Seedlings, nursery grown, do as well as can be expected of a plant that attains maturity in two hundred years but few of us will live to see our seedling flower.

The Indian name for the giant cactus is saguaro and under this name it is known in Arizona where it is the state flower. So important is the saguaro to the Indians that their year begins at



Echinocereus mojavensis var. *triglochidiatus*



Ferocactus wislizenii



[By permission Panorams (London)



George Oland

Carnegiea gigantea

[See page 387]

the fruiting season, when a celebration is held after the gathering of the crop. The juicy red fruits are eaten raw or cooked into a preserve which is stored in clay vessels for use throughout the year. From this syrup an intoxicating beverage is also made, and even the seeds are dried and saved for winter use, when they are ground on a metate into a paste from which cakes are made.

Although a large saguaro may attain a height of forty or fifty feet and with its branches weigh six to seven tons or more it is not deep rooted but depends for support on surface roots radiating like the spokes of a wheel for fifty to sixty feet in every direction. The massive stems are composed of watery tissue, braced by a framework of rods parallel to each other and united at intervals into a hollow circle. After a plant dies these rods remain and they are used by the Papago Indians in the construction of their houses. Desert woodpeckers hollow homes in the soft flesh of the stems but the plant walls off the cavity with scar tissue which hardens and forms shoe-shaped nests which are later preempted by owls and other birds.

Botanists studying the growth of the saguaro have found that only those seeds which germinate in the protection of shrubs survive and that for the first two years the growth in nature is about $\frac{1}{4}$ inch, in 8 to 10 years the young plant attains a size of four inches and attains to three feet in thirty years. It first begins to branch at 15 feet and from then on the maximum growth is 4 inches a year.

Saguaros are bold and outstanding but our next "stay-at-home" is most retiring, and can seldom be found when not in flower. *Peniocereus Greggii* (Eng.) B.&R. has a very large root tuber which sometimes attains a diam-

eter of 22 inches and a weight of 60 to 125 pounds and this tuber is the principal water storage organ of the plant.

From the underground tuber the plant sends up weak, 4 to 5 angled stems, seldom more than an inch in diameter but sometimes 9 feet high. The stems are so weak that they must depend on the support of a tree or shrub to carry them and are therefore found only under a desert shrub or tree. In Arizona the plants flower from June 12 to June 16th, usually all of the plants in one district flowering the same night and it is then that they can be located by the strong perfume of the large, night-blooming, white flowers.

A few instances have been recorded of a small tuber that has been reestablished in cultivation but most of the plants removed from their desert home die within a short time after removal. *Peniocereus Greggii* is, therefore, a plant to be visited in its home and not one for home cultivation.

Arizona has wisely enacted a law prohibiting the removal of any desert plant except under permit and permits are granted for collection of plants for scientific purposes with a restriction that plants so collected must not be taken within a reasonable distance of the highways and that certain species which are becoming rare can never be collected. The law goes further and prohibits the transportation of desert plants except under permit as above noted.

If you would meet these friends of mine you must come to their homes to visit them as I do at frequent intervals. If you cultivate their acquaintance under their home conditions you will appreciate them the more and be assured that a desert visit is good for the soul.

W. TAYLOR MARSHALL.



George Oland

Peniocereus Greggii

[See page 390]

Colletia cruciata Gill and Hooker

Recent inquiries have been received from widely separated parts of the

United States about the method of propagation to be used for *Colletia cruciata*. Sometimes such inquiries re-

fer to the plant now under its proper name, sometimes it is called *Colletia horrida* Hort. and again it is spoken of as the "Crucifixion Thorn."

It is a branching shrub or small tree in California, reaching a height of eight to ten feet, although it is reported not to exceed four feet in its native Uruguay, gray green in color the branches flattened and bearing large, triangular spines and a few, small, elliptic leaves. The small white flowers are borne on short pedicels at the base of the spines and are followed by three-lobed, three-celled, capsular fruit. Seedlings are bright green and resemble a small cypress.

Colletia is a member of the very interesting Buckthorn family (Rhamnaceae) which is well represented in the United States where several species of the genus *Rhamnus* are valued as ornamentals and one species, *Rhamnus Purshiana* DC., produces Cascara sagrada bark used extensively in drug manufacture while an Asiatic species *Zizyphus jujuba* Lam. produces the flavoring jujube. *Colletia*, however, is a tropical genus and its species require glass house care except in the sub-tropical districts of Florida, Texas and California.

Colletia cruciata can best be propagated from seeds although special methods are advisable because the seedlings grow a long, thread-like tap root, which is easily broken in transplanting and, if broken the plant will not survive. We usually plant our seeds in small pots, one or two to a pot, which can be broken for the removal of the seedling for transplanting or, better yet, in #1 tins or soup cans which can be planted with the seedlings and allowed to rust away in the ground.

Not to exceed 5% of cuttings have been rooted when attempted in base heated beds but none have rooted without bottom heat.

The illustration shows a portion of a plant in the garden of Phil Daubner of Los Angeles from which seeds and seedlings have been generously distributed for a number of years and this plant is the source of all *Colletia cruciata* in western collections as far as I know.

The use of the name crucifixion thorn as applied to *Colletia cruciata* is manifestly inaccurate as this Uruguayan plant was unknown in Asia or Europe till the sixteenth century. The true crucifixion thorn is a member of the Rhamnaceae although it is not certainly known if *Zizyphus Spina-Christi* or *Paliurus Spina-Christi* was the exact species.

W. TAYLOR MARSHALL.

Epiphyllum crenatum (Lindley)

G. Don.

In the April issue W. Taylor Marshall indicated the great variety of Orchid Cacti now available and showed that these forms were produced by crossing a species in the sub-tribe Epiphyllanæ with other species in the Cactaceae. In some ways the Epiphyllanæ are dominant, particularly in form, so that the whole group of Orchid Cacti has the flattened, leaf-like stems inherited from them, rather than from the other species of Cacti which have been used in breeding. Three species within the Epiphyllanæ have largely contributed the main characteristics, if not the great diversity, of the group: *Nopalxochia phyllanthoides* (The German Empress), *Nopalxochia Ackermannii* and *Epiphyllum crenatum*.

Numerous hybrids show symptoms of having *E. crenatum* as one of their parents and a detailed description of this species is, therefore, of general interest to the collector of Orchid Cacti. In addition *E. crenatum* is a beautiful plant with a character all its own, and



Scott Hazelton

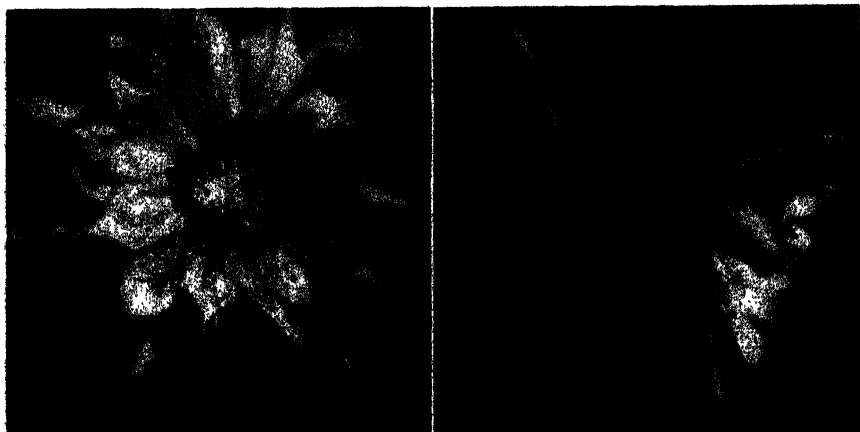
Colletia cruciata

[See page 391]

well adapted to greenhouse or living room culture.

T. Mac Dougall (Cactus and Succulent Journal, p. 149, 1945) described

some Mexican species of *Epiphyllum* and wrote: "*E. crenatum* is another species that seems to appear in most lists. It is rather widely spread in



Figs. 1 and 2. Flower of *Epiphyllum crenatum* (Lindley) G. Don.
Side view of flower showing long tube and cup-shaped limb.

somewhat scattered groups, on higher altitudes of Oaxaca and Chiapas. These show much variation and perhaps consist of several closely related species. In any case systematic study is needed." This variation will probably prove still greater when types from other areas like Guatemala and the type locality, Honduras are included in the study.

The species has been in cultivation for a long time (it was first described by Lindley in 1844), and we do not know how often new, wild plants were introduced nor of what types the introductions included. The fact is that most plants in cultivation under the name of *E. crenatum* do not conform in every detail to the original botanical descriptions. The most concise of these descriptions is probably the one of Britton and Rose in *Cactaceae* IV. 1923 which follows:

Old stems woody and terete, branches glaucous, often rooting at the tips, rather stiff, 2-3 cm. broad, obtuse, erect at least at first, with large, deep crenations, cuneate at base, the midrib thick; areoles at base of stem and

branches often bearing hairs or small bristles; flowers very fragrant, rather large, limb 10-12 cm. broad, cream colored to greenish yellow, tube 10-12 cm. long, slender, bearing linear scales 2-3 cm. long; inner perianth segments oblanceolate, 6 cm. long; filaments yellow; stamens white; stigma lobes narrow, ovary scaly, some of the scales 2 cm. long, spreading."

To this description Berger in *Kakteen* 104. 1929, added the following points, quoted in translation from the *Epiphyllum Handbook*, Haselton 1946: "notches below areoles are rounded, — tube reddish toward top, outer perianth segments broad linear, greenish-yellow; inner ones spatulate; white or cream colored: — style and 8 lobed stigma white." Berger calls the color of the joints "gray-green" which is not exactly in agreement with Britton and Rose's "Glaucous" but the color of cactus plants is so variable that it is doubtful if it should be mentioned at all in formal descriptions, except in special cases.

The plant in my possession, from which the accompanying photographs

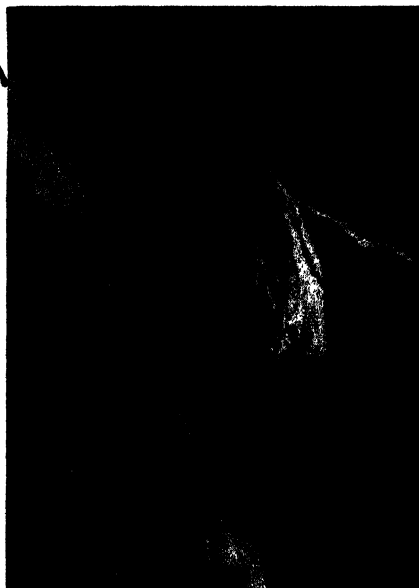


Fig. 3. Flower after withering.

were taken, is, without doubt, *Epiphyllum crenatum* as determined by the shape of its joints and by the color, size and structure of its flowers, yet this plant differs in some important characteristics from the two classical descriptions cited. The scales on the tube do not reach more than 2 cm. (B. & R. 2-3 cm.); on the ovary they do not exceed 0.6 cm. (B. & R. 2 cm.); the joints are 3-4 cm. broad (B. & R. 2-3 cm.), these measurements were made from areole to areole and, therefore, do not give the maximum width; no bristles or hairs are found in the areoles; 9 to 10 stigma lobes are found instead of 8 as noted by Berger. Additional characteristics, which may well be added to clear the way for a more systematic study of the species, are: The plant branches according to a fairly definite pattern, each branch produces one side branch from one of its lowest areoles, usually away from the center

of the plant and this side branch produces another side branch in the same manner; joints of triangular cross-section are rare but do occur; the flowers require 7 to 8 weeks to develop from the time the tiny green buds appear in the areoles and then open at dusk and remain open for about two days; in the east the plant blooms in April but in California it is reported to be a late summer bloomer.

A characteristic of the flower which is rarely mentioned is the shape of the inner petals which are often pointed, because the ends are slightly pinched as can be noted in the photograph, a feature that is often inherited by its hybrids. Another feature is the slow development of the fruit. If the flower is pollinated, the ovary remains in the condition shown on page 395 for more than a month before it swells and grows. This is in definite contrast to other species, for instance *Nopalxochia phyllanthoides*, in which the ovary begins to grow immediately after the wilting of the flower. For still more details of the flower the pictures may be consulted. It is hoped that they may stimulate other cactus and plant lovers to acquire a specimen of this *Epiphyllum*, which is easily raised and of fine beauty.

E. C. ROOSEN-RUNGE, M.D.

Our Garden

About 1927 my wife and I arrived in Southern California from Oregon and, like all newcomers to this State of sunshine and flowers, we spent most of our time for the next several years travelling throughout the Southland. Naturally on our trips we came in contact with the desert and thus came to know cactus at close hand. These strange desert plants and their exotic flowers intrigued both my wife and

myself and soon we had collected and bought some of these plants and started a small cactus garden.

In the next two or three years our garden grew to forty or more species. In 1935 we bought a home and the first thing we did was to move our plants and start a larger cactus garden at the new home. During this year we became acquainted with one or two nurseries which specialized in succulent plants and our collection commenced to grow, a growth which has continued for the intervening years until at present we have increased our collection until more than half of our yard has been taken into our cactus garden.

The soil of our new home was not very good so we decided to do something about it, we brought in rocks and after building walls from six to twelve inches high around the different beds, we bought good garden soil to fill them and in this way we attained good drainage and a soil that dried out readily.

In the process of building up our garden we discovered that many of our plants did not enjoy the full sunlight, of which we have a great deal, so we built a small lath house, this was followed by a glasshouse eight by eighteen feet in size.

Since the building of the first lath house we have found it advantageous to put in more lath until about half of our garden is so covered. All this building was work, but it never seemed to bother my wife or me as there was always something new either in plant or flower, to keep our original interest on the increase and we find that, though the building program seems to have finally reached completion, we can always find enough study or work in our garden to keep alive our intense interest in succulent plants.

H. G. RUSH.

Editor's note.

Generosity has always been the outstanding virtue of the true cactophile, and the Rushes live up to the best traditions and cuttings and plants from their garden are to be found in many private gardens throughout the United States. In their case the collections they have made of special genera in the Cactaceae and Crassulaceae have been so thoroughly done that the representation includes many species not found in other collections, therefore they have been able and glad to contribute specimens to many of the botanists in xerophytic plants at several of our universities, thereby materially assisting the work of those botanists.

For this reason I felt that a story of their garden would prove interesting and instructive and I asked Homer to prepare an article for me. The result, which is here presented is notable only in what it does not say. Homer Rush has specialized in the genera *Rhipsalis* and *Gymnocalycium* in the Cactaceae and has acquired outstanding collections of both genera. He is president of the Los Angeles Cactus and Succulent Society, a group of students who meet monthly to study the morphology and taxonomy of succulent plants. He is also a member of the Executive Board of the Cactus and Succulent Society of America.

Ethel Rush is a collector of the Sedoideae and plants from her collection have been described in the works of several botanists. She is the Recording Secretary of The Cactus and Succulent Society of America and a gracious hostess to the numerous cactus clubs of Southern California, one or more of which meet at her home each month.

Recreation Park, Long Beach, Calif.

In March of 1933 an interested group of amateur Cactus and Succu-



Homer Rush inspects the bed of Canary Island Aconiums.



Homer and Ethel at the entrance to the cactus garden. Since the picture was taken the hedge in the background has been replaced by a slightly wire fence.



Recreation Park, Long Beach, Calif.

lent collectors was organized, the Long Beach Cactus Club, under the very able direction of Mr. Jack Kleinke. President Kleinke was endowed with one idea, that the City of Long Beach should have in one of their Parks a representative Cactus Garden. Following his suggestions the Long Beach Cactus Club decided to attempt to build such a specimen garden. A number of locations were considered but the site chosen was Recreation Park, in a plot made available by the Long Beach Park Department.

This part of the Park at that time was overgrown with weeds and the adobe ground was at least as hard as granite but this had no effect upon this ambitious group. The ground was broken with a team and plow and a large mound was built at one end of the

proposed garden, with ample drainage built in and then the rest of the garden was laid out and the walks and beds were built, this labor was all done by the Garden Committee and volunteer labor of the Club membership.

By this time many persons who had Cactus and other Succulent collections had heard of this undertaking and, like all true enthusiasts, gave many fine plants to the Garden. Many of the donations were collected plants and some of them quite large. A number of large plants of *Cereus* took days to move into place because of their size.

At this time two years had elapsed and the Specimen Garden was beginning to take shape and the Club had elected as their President Mr. J. F. Kaufman, who had always been an active advocate of the Garden, and with

renewed vigor the work went ahead for the next year under his direction.

There was always work to be done and plants to pick up from donors but it seemed that there was always someone with time to spare who was willing and anxious to do the job. One large donation of Aloes and Yuccas was made by the Huntington Botanical Gardens through the kindness of its Director, Mr. William Hertrich, and Mr. Yale Dawson donated many of the plants which he collected in Lower California, including many large specimens.

By the end of Mr. Kaufman's term as President the Garden was well along towards completion and Mr. "Andy" Anderson took over the Presidency. Under his direction the finishing touches of planting was brought to a climax and by the end of his second term, was practically complete except for a base upon which a bronze plaque was to be mounted. This base is a fine specimen of the stonemasons art, built of specimens of rocks and minerals collected by some of the members, who were also minerologists.

The final scene in this story was enacted at 2.00 P. M., June 12th, 1938, at which time the Officers and the Board of Directors of the Long Beach Cactus Club officially turned the Specimen Garden over to a group of City Officials representing the City of Long Beach. At this time the dedicatory plaque was unveiled and the Garden became the property of the City to be maintained permanently as a feature of the Park.

Since the war's finish there is again some activity in the Cactus Club with a program being outlined to add a large new section to the Specimen Garden which will feature particularly the other Succulents.

This may sound like a fairly simple feat to some of you but for an organ-

ization which has seldom had a membership of over forty it has been really some job and the Club may well be proud of its accomplishments.

HOMER RUSH.

Succulents in Cincinnati

Irwin M. Krohn has made a hobby of his job as President of the Cincinnati Park Board and is keenly aware of the trend of popularity in plant life. It is, therefore, understandable that in 1938 he realized the growing popularity of Succulent Plants and planned a suitable house in which these interesting specimens could be grown for the admiration of plant lovers in southern Ohio's metropolis.

At that time the conservatory in Eden Park consisted of a foyer, a palm house extending eastward, a fern house as a northern extension and the show room, extending southward. In this show room the Cactus Show in connection with the Second Biennial Convention of the Cactus and Succulent Society of America will be held on June 28, 1947. A new extension, 45 by 75 feet with a center height of 25 feet, was built to be known as the "Cactus House."

The new wing was completed and dedicated on November 4th, 1939 with Lad. Cutak of the Missouri Botanical Garden as the principal speaker. Several hundred specimens of Cacti and the other succulents had been assembled from all over the world and planted in an artistic setting. For the benefit of students the plants are catalogued and numbered and a 32-page Catalogue Guide was printed:

A kidney-shaped island in the center of the house has a specimen of *Echinocactus Grusoni* Hildm. as the focal point as illustrated on page 401. Opposite this is a mound of tufa rock in which Mammillarias and other cacti and succulents are planted in natural

*Opuntias and Aloes**Carnegiea gigantea*

positions, then a section devoted to large *Opuntias* and *Aloes* with lower growing turks caps and barrel cacti below them (page 400). To the left, on the island tall *Cerei* and *Yuccas* accent the planting (page 401).

At the east end of the house a twelve foot *Carnegiea gigantea* (Engelm.) B. & R. the Arizona giant cactus is surrounded by plants of *Nyctocereus serpentinus* Lac. & Rod., the Queen of the Night, *Pereskias*, the leafy forms of cactus, *Agaves*, *Yuccas* and smaller specimens of *Echinocerei*.

The east end of the island features *Opuntia brasiliensis* (Willd.) Haw. and plants of *Echinopsis* and *Echinopsis* hybrids.

Beyond this three large plate glass windows permit a view of the orchid room where the orchids share honors with *Bromeliads* and the epiphytic cacti. Flowering plants are displayed in these windows and so wide is the flowering range of the epiphytes that flow-

ers of some type are always available.

Passing the display windows we come to a showing of *Euphorbias* which are to the African deserts what cacti are to the American deserts. These spurges have assumed almost all of the familiar cactoid forms but lack the large, colorful flowers of their American cousins.

Beyond an entrance to the propagating room *Sedums*, *Aloes*, *Stapeliads* and other succulents occupy the remaining space as illustrated on page 401, looking back on the north walk.

The Kentucky, Indiana, Ohio Cactus Club take great pride in the Cactus House in the Irwin H. Krohn Conservatory in Eden Park in which they had a share as consultants of the Park Board and invite visitors to Cincinnati to share with them the thrill of viewing its outstanding collection of succulent plants.

C. R. COLE.

Cincinnati, Ohio.



*Specimen of
Echinocastus
Grusoni.*



*Cerei and
Yuccas.*



*Aloes
Stapeliads*

The Irwin H. Krohn Conservatory, Eden Park, Cincinnati, Ohio

A Book or Two

Minor Elements. Edited by Firman E. Bear and Herminie B. Kitchen. The Williams and Wilkins Company, Baltimore, Md. 189 pages. \$2.00.

This book is reprinted from the July and August (1945) issues of *Soil Science*. It presents a symposium as to evidence and concepts on functions, deficiencies, and excesses of the so-called minor elements in plant and animal nutrition. The 21 papers were prepared by recognized specialists and are to be regarded as authoritative and the most up-to-date summary available.

The minor elements considered, include not only boron, manganese, zinc and copper but also aluminum, chlorine, cobalt, nickel, fluorine, iron, magnesium, molybdenum, selenium, silicon, sodium and sulfur. An interesting chapter discusses the occurrence of mineral nutritional diseases of plants and animals in the United States. The role of plants as accumulators of minor elements is described in another and is the basis for the recent use of selenium in the control of certain insect pests.

It should be emphasized that the book is not a manual for the identification of minor element deficiency or toxicity symptoms nor are recommendations made as to their use. Intended as a summary of critical research the book is probably somewhat too technical for the average reader.

NEIL W. STUART.

The Rhododendron Yearbook for 1946.

Published by the American Rhododendron Society at Portland, Oregon, for its members. 176 pages, illustrated.

The first 56 pages are devoted to text, the balance is a copy of the Rhododendron Species List published by The Rhododendron Association of Great Britain. This list gives what is supposed to be the scientific name (no

authority cited), a suggested translation of the specific name, the symbol for British hardiness rating, the series (and at times subseries) to which the species belongs and a very brief and often inadequate description.

The preliminary pages are full of show doings with regular Chamber of Commerce type pictures; a large chunk of Hardgrovia; a note on top-grafting out-of-doors (in Seattle, this time); brief reports from Mr. Seevers in Kansas, Mr. Lee in the District of Columbia, two articles directed toward garden design by Messrs. Otho and Holmdahl and a briefer note on *Rhododendron occidentale*.

There was presented as well a slender bulletin, "Rhododendrons for Amateurs (price 25 cents) which should have been titled Rhododendrons for Amateurs west of the Cascades.

The Handbook of Rhododendrons.

Compiled and Published by The Arboretum Foundation, Seattle, Washington. 198 pages. \$5.00.

This presumably is a publication for the clientele of The Arboretum Foundation for there is nothing in the introduction that suggests that any other audience was intended. It is made up generally of "a compilation, a bringing together, with slight revision of some of the key articles by a number of authorities which have appeared in the Arboretum Bulletin over the past several years. Other important titles have been deliberately sought in order to round out the subject matter." No Easterner, therefore, has any reason for complaint, except that some of the "important titles" are somewhat inadequate.

One wonders too, if by now the British aren't pretty weary of being copied and recopied. Their list of synonyms is not much account since no authority

is given, either for the invalid name or for the proper one.

The total lack of illustrations is the most lamentable factor, because it is a little difficult to believe that everyone of the 700 purchasers of the first edition will know what all the material looks like.

*Auratum*s for *Amateur Gardeners*. Alwyne and Ralph Buckley. Privately printed, Esperanza Lily Gardens, Langley Prairie, British Columbia. 24 pages, illustrated. \$1.00.

This is a very practical bulletin written by the people who have been solely concerned with the production of sound *auratum* bulbs and who have found the way to do it for themselves and want you to know as well. A longer and more detailed version is promised later. Meantime, it will be to the advantage of growers and would-be growers of the Gold Banded Lily, here called the Golden Rayed lily, which is much more poetic, to get this booklet and learn the basic principles that have been put into it according to the experiences of the growers.

Old Salem Gardens. Published by the Salem Garden Club, Salem, Mass. 72 pages, illustrated with drawings.

At the 10th Anniversary Meeting of the Garden Club, in January 1938, papers were read about Old Salem Gardens and from that felicitous idea and happy occasion grew the material that is now incorporated in the present booklet. The reviewer likes the idea and the result, for even he can recall, when there were old gardens here where now one finds progress in the form of routine grass plots and second-rate evergreens. Salem itself is a word to evoke recollections and it seems very happy that the garden club should have managed a book in which historical accuracy does not dim enthusiasm nor romantic flights weary the reader who

perchance does not believe in romance. In addition to the descriptive notes there are plant material lists and an excellent index.

Succulent Plants. W. Taylor Marshall. Photography by Rupert Leach. Sawyer's Portland, Oregon, 1945. 114 pages, illustrated and accompanied by 20 Kodachrome reels. Price of book, 20 reels and View-Master \$11.50; without the last item \$10.00.

As all our readers now know, there could be no better choice than our special editor, Mr. Marshall, to write the text, and he has had splendid collaborators in furnishing material to be photographed.

The book begins with an Index to the View-Master Illustrations, of which more later. There follow sections which cover in a brief fashion the important points that anyone should know in setting out to cultivate cacti and other succulents. Then comes the main body of the book in which are discussed the Plant Orders which provide the plants discussed under "Succulents" which term, of course, includes the cacti. It is good reading. Moreover it is helpful in that it gives the beginner suggestions as to which plants to try first with succinct directions for their culture. There is a good bibliography and a fine index.

The Kodachrome slides that come with the book are stunning. One feels the urge to set out at once toward a new hobby, but perhaps also to move to the southwest where sun and shadow add to beauty in a way that is not found elsewhere in this country. Buy it by all means and find yourself lost to another gardening delight.

Greenhouses. W. J. Wright. The Orange Judd Publishing Co., Inc., New York, 1946. 269 pages, illustrated. \$2.50.

The sub-title of this work, now in its

3rd edition reads, Their Construction and Equipment.

It is a concise, practical treatise which leaves nothing to the imagination. It is simply written, so that the layman will have no excuse for misunderstanding, if he really reads it. The first paragraph of chapter one, states the field. "The purpose is . . . to present such information regarding the location, adaptation, erection and equipment of greenhouses as will enable the reader to decide upon the structure best suited to his needs, select the material needed, erect or supervise the erection, and to arrive at some conclusion as to the equipment most likely to render the service required."

Spray Chemicals and Application Equipment. J. A. McClintock and Wayne B. Fisher. The Greenlee Company, Chicago, Ill., in collaboration with The Waddell Printing Co., La Grange, Indiana, 1945. 320 pages, illustrated. \$4.50 postpaid.

This book may have many virtues, but the one that seems outstanding to the reviewer is the excellent organization of the material which is presented with such clear headings and sub-headings that it would seem impossible to fall into error.

It is a book about sprays and spray equipment, using the term spray in its widest sense. It is not a book about plants, plant diseases or insects, although all of these are mentioned. It is really a compendium to teach you what is available, what each material is capable of doing and what apparatus are required. There are numerous citations of authority and/or source in the text and more references to the bibliographic list at the end of the volume.

On the dust cover, there is a list of the persons for whom it was written. The amateur horticulturist stands third. He should be everlastingly grateful for

it in all its parts, not forgetting the excellent directories of manufacturers given on pages 304-310.

Chrysanthemums. How We Grow Them Out of Doors. By Members of the Portland (Ore.) Chrysanthemum Society and Others, 1946. 97 pages, illustrated. \$1.50.

This is the current revised edition of a booklet that first appeared in 1942. There are fourteen contributors.

In general plan it follows the routine for any bulletin on the cultivation and use of a particular plant, but it has the great advantage over the work of a single writer in the variety of styles and diversity of approach.

The culture as outlined is that which can be given by enthusiastic and zealous amateurs who bring their work to professional level. There is no discussion of commercial production.

The advice is sound and simply presented and can be applied basically anywhere. The point of view and procedures as such will be applicable on the Atlantic seaboard only south of Norfolk, Virginia, around the Gulf and in those states far enough south to allow an economical use of late-maturing varieties and cloth shelters. There is no discussion of small-flowered chrysanthemums as they would be grown in the cold states and only large flowered types are illustrated.

The Seed Trade Industry. Edgar J. Clissold. Bellman Publishing Co., Inc., Boston, Mass., 1946. 48 pages, illustrated. \$1.00.

This is one of a "Series of 75 Vocational and Professional Monographs that have become practically standard equipment wherever guidance and rehabilitation activities are conducted * * * *"

There is presented on pages 7 and 8 an "Analytical Index of Occupations"

in the Seed Industry, for which brief elaborations are given in the following pages, which are almost "job descriptions." The person who 'thinks he might like to go into the seed business' can quickly grasp the organization that makes it what it is and come to a fair decision as to whether or not he should go further in his search.

For our own readers there should come a much more lively appreciation of what lies behind the catalogues from which they order their seeds or bulbs, as well as various lists of addresses, references and the like, all of which are pertinent.

Native Trees of Florida. Erdman West and Lillian E. Arnold. University of Florida Press, Gainesville, 1946. 212 pages, illustrated. \$3.75.

Do you know gumbo-limbo? Milk-bark? Black Titi? Marlberry? Geiger-tree? Fiddlewood? You may have seen one or more of them without knowing their names if you have wintered in Florida, for they are subtropical trees that do not range north of the peninsula. Now you will be pleased to make room for this guide on your shelf of tree books, illustrated as it is with clear outline drawings and a few photographs. And more, when you go

South you will want to take it along—this thin octavo, stoutly bound, lying flat in your suitcase. Three paragraphs, "description," "distinguishing characters," and "general account," the last chatty and undocumented, make quick comparisons easy when naming any specimen at hand. A master key, glossary, list of references, and index also increase its usefulness. The book would have been greatly improved by attention to a more compact arrangement of textual matter, running around and rearranging the figures, thus reducing the number of pages and wedding the reading matter and illustrations. Also the figures are of unequal quality. The book's chief inadequacy—and this is a personal taste—is the want of rich reading stuff, thick with facts about the backgrounds of the arresting names that the trees have acquired, the significance of their geographical distribution, and their life-history, ethnic and folklore *notabilia*. The botanical names, with more important synonyms, are given throughout. But, after all, for a tree guide "the name's the thing," and from that you can probe the references provided, extending your acquaintance with an unfamiliar freedom.

JOSEPH EWAN.

The Gardener's Pocketbook

Shrub notes from Tennessee referring to April 1946 Magazine

Spirea Billiardi, a hybrid of *S. Douglasii* × *'salicifolia* is especially effective when cut back each spring and top-dressed with fertilizer. Actual cultivation is not needed as it will form dense thickets as does its close relative, *S. tomentosa* in Eastern pastures. The group varies in color from fuzzy white to deep pink spires, prefers full sun, and is most effective when massed unless fed and cut back as a specimen.

Unfortunately it enjoys moisture and hence does not make a good cover for dry banks and the gradual blooming of the large panicles tends to give a period of seedy effect that is not too pleasing.

Cornus Mas which really makes a lovely big specimen shrub—almost a small tree when given the space to develop—is far showier in flower than *Benzoin aestivale* which makes a misty golden mist in its thin thicket-like growth in semi-shade. The earlier winter-flowering shrubs, both jasmine

and witch hazel, are far more affected by alternations of hot and cold and the bloom rarely as colorful as when continued cold holds them back enough to give a real burst. In habit and use both, they are sufficiently good to rate a place in tough, semi-shaded spots. In the Nashville, Tenn., zone both the cydonias and forsythias putter along from Xmas until spring and only occasionally give that gorgeous burst of color that is taken as a matter of course in New England.

Loropetalum chinense. It was in the warm winter of 1938 that I first discovered this delightful mound of white, a mound much like but more full of bloom than the usual cotoneaster. I immediately planted one near my terrace where I could enjoy its pleasant habit and almost evergreen foliage. My reward a few scattered blooms of little effect until 1946 when after continued cold it approximated the delightful picture in the April issue. As Mr. Morrison suggests, like *Neillia sinensis*, it is surprising to find that it is not touted as a novelty by some progressive nurserymen. Both are far more satisfactory than most of the hybrid philadelphus and deutzia offerings.

Kolkwitzia amabilis and *Cladrastis tinctoria* are both lovely but have only one characteristic in common to my mind, they are unpredictable in their reaction to pruning. The Beauty Bush I first planted in New England some eighteen years ago, as a novelty. After four or five years of apparently excellent growth it actually bloomed and now aspires to ten to twelve feet. That is where my trouble began as I had not foreseen such height nor its absolute refusal to clothe itself to the ground. Its arching habit is lovely in itself but even husky day lilies (not to consider lawn) refuse to thrive in its shade. Now, normally, a periodic cutting back will lower a shrub most hap-

pily or, at least, one can cut back three to four foot new growths and count on the development of many branches and a thicker head. But this is just what this Beauty Bush refuses to do. Nip a new shoot and rarely does any new leader or even low branch develop for that season. There may be new sprouts from the base or the bend of an old trunk but never in the expected spots. My 1938 plantings here in Nashville exceed in size my 1930 one in New England: they are equally lovely, equally arching, and equally unamenable to training. They withstand drought to perfection, grow like weeds and even self-sow and are so lovely that they should be used in quantity BUT no such beautifully arching shrub is good in a mass and its charming foliage has not quite the character for specimen use.

The Yellowwood or Shittamwood as it often is called here in its native Tennessee is also arbitrary. Clean trunked, clean foliaged, and beautiful in bloom I planted it in Massachusetts for high-branched shade in 1930, in fact bought a ten to twelve foot specimen with a single trunk that died and for five years I worked with the vigorous new shoots to reduce them again to a single trunk. At present the main branches V out a few feet above ground, split at the slightest provocation but otherwise make a round-headed tree which blooms occasionally with long white panicles. In Nashville, in 1938, I moved next a big native Yellowwood of clustered trunks, the smooth beech-like bark a joy among the warted trunks of hackberry and elm. Twice only has it bloomed to perfection and then so freely as to take all the strength from many of its main branches. It is slow to flower (as I found in New England) but it is also most irregular and I have hunted in vain for self-sown seedlings in the vicinity of the old tree. Inci-

dentially the hunt was not made easier by the similarity in bark and leaf of the prolific common ash in the same vicinity. In fact I transplanted some twenty hopefuls before I found the difference. This is a native, a rather rare native—of Tennessee only. It is distinctive despite the fact that it blooms with the equally drooping Black Locust in this climate but its uncertainties of habit do not permit use in important cities.

R. S. STURTEVANT.

Elliottia racemosa

These few lines are intended as a postscript to a note I wrote about *Elliottia racemosa* and which was published with two photographs in THE NATIONAL HORTICULTURAL MAGAZINE, July 1941.

There are two nice specimens of *Elliottia* growing in my garden. They have been here for over ten years. During that period we have had many cold spells. Practically every winter the thermometer falls below zero, F. They have had no protection of any kind and rarely, almost never has there been any winter injury.

One *Elliottia* was planted in my trial garden in a carefully prepared mixture of black New Jersey peat and sand, in imitation of that of its native habitat. During this time it was carefully watered and tended. After seven years it was moved with a large ball to its present situation and again planted in a congenial soil mixture in a sunny place, near the base of my rock garden.

The other *Elliottia* was planted promptly in a sheltered sunny spot in untempered native Gladwyne clay, and even during dry spells was never watered.

Although the latter was slow to get started, it is now thriving lustily and is 7 feet 6 inches tall. The former plant, which was coddled, is 5 feet 10

inches tall. Evidently *Elliottia* likes to be let alone!

MARY G. HENRY,
Gladwyne, Pa.

Two Blue Columbines

To me, the most beautiful Columbine is that of Colorado, *Aquilegia caerulea*. When you get it unadulterated, the pure blue and white combination is distinct from all other blues in the genus.

There is another blue *Aquilegia* of surpassing beauty, I have seen the flowers only from imported roots years ago. This is *A. glandulosa* from the Altai Mountains in Siberia and I note that Bailey remarks "one of the handsomest" but it is not for average gardens for one would have to be located where *A. caerulea* is native. But oh, it is beautiful. If one studies the genus as to habitat, it is found on all the Continents. I have never seen any of those from the Orient but these are said to have beauty yet I fear that here again it will mean altitude much as our rarest California lilies do.

E. O. ORPET,
Santa Barbara, Calif.

Sanvitalia

I tried *Sanvitalia* for the first time and was very much pleased with it. I had put in a flagstone terrace with a yew hedge on two sides. As it was very new the edges were too apparent so I planted the little zinnia-like flowers where they would fall over the stones. They were blossoming soon after being set out and they spread out and did just what they were supposed to, covering the space left for the hedge to fill in time.

The blossoms are such cheerful saucy things and they can be used in small arrangements very well.

RUTH A. STEPHENSON,
New Haven, Conn.

Aralia spinosa

This is the sort of tall shrub that one would scarcely think to order from a catalogue, and yet when the sultry last days of July settle down over the countryside, this near-tree puts out its great inflorescences of creamy white flowers, and takes on an almost exotic beauty. On closer inspection these may have only the structural beauty that is always the wonder of all flower forms, but who cares for such minutiae when the temperature is at 80°?

It has another time of beauty when its black berry-like fruits cover the same inflorescences which have turned to crimson or reddish purple.

In planting the tree, one must recall that it makes bare, almost stark, single trunks covered with stout prickles, and also that it does sucker and send up its stems where one does not want them. One must remember also that it can well be planted in a mass of lower shrubs above which it rises majestically, choosing if one may, shrubs with a much finer foliage, to give contrast.

Chrysanthemum, Missouri

I bought, traded and was given many different varieties of Chrysanthemums for several years and in forty-three bought several hardy 'mum plants from Youdath's in Mentor, Ohio. These have proved to be my pride and joy. Their variety called Jewelry, an introduction of their own, is the most beautiful I have. A two-year-old plant (in fact six of them) lived through sub-zero weather with no protection and bloomed from late September through the middle of November. It is a spray type with two-inch cushion blossoms, orchid in color and grew approximately five feet high. At the top it was well over three feet in diameter, and it is a prolific bloomer. All six plants responded well to lots of water and Vig-

oro and cow manure tea. I gave the plants no protection to force the blooms or while blooming.

R. O. WORRELL,
Mexico, Mo.

*From the Midwest
Horticultural Society**Maclura pomifera*

Mention of the Osage orange is always good for an argument in any company. Some will remember the glossy foliage and the long rows of trees serving as hedge and windbreak, others will remember the stout thorny branches and the mean tears in flesh and clothing they can inflict.

In early times the Osage orange was the hedge plant that bordered pastures in the days before barbed wire. A heavy row of these was sufficient to turn cattle and other animals. These hedges were developed by thick planting and then topping every few years so that a dense bushy plant was formed. This was further aided by the habit of the plant to send up root shoots. In time these hedges were no longer needed and the shoots grew and formed substantial windbreaks.

The plant is hardy, and grows on most soils. It makes an excellent tall screen that is an attractive glossy bright green even in severe droughts. It is also a very protective screen as a row of these is well-nigh impenetrable. This is advantageous for bird life, and the conservation of other animals. The thorny character and the somewhat spreading habit of the root shoots would suggest that this be used only on farms and large suburban areas where some space can be given over to it.

ELDRED E. GREEN.

Acer platanoides Schwedleri

The red form of the Norway maple is not too often seen correctly used to

be appreciated. While authorities have decried the use of colored foliage as being an overdone fad there are some places and some exceptions. One of the best exceptions is Schwedler's maple. In the spring the red coloring of the foliage is striking. This later turns to a bronzy green, and then to a dark red as fall takes over.

During the summer the bronze color is especially appealing in large planting as parks, cemeteries, estates and as occasional specimens flanking street plantings of the green type. When used in this way the color break is especially necessary as the regularity of form might otherwise become monotonous. Properly the best use is as a foil or color break to avoid an excess of plain color.

The plant is adapted to a wide range of climate and a wide variety of soils. The form is propagated by grafting and so commands a higher price, but a relatively small number are needed. Wherever large numbers of Norway maple are used a proportion should be in Schwedler's variety.

ELDRED E. GREEN.

Ginkgo biloba

The well known Maidenhair tree is one of the plants that needs to be brought forward again and its uses pointed out. This tree as most know is one of the very few plants not known from the wild but solely as a sacred plant grown in Chinese temples. It truly can be called a living fossil as its ancestors were widespread and seemingly identical with the present species. Horticulturally the Ginkgo is a hardy tree of medium stature. In youth the tree is spire-like. For ascending effect it can be used much more advantageously than the forms of Poplar which are commoner and undesirable. After about a quarter

century the Ginkgo develops some low spreading branches in addition to the tall spire of the trunk. The combination of spreading and spire habits is unique and beautiful.

It is adaptable to soils and exposures. It is also one of the best plants for city use as it can withstand crowding, poor soil, dirt, and all the other elements of a city. Industrial and commercial interests could well use many more of this proven plant. It is an asset to any planting and particularly so around buildings.

Many years ago this species was widely planted in parts of Chicago. Today these are the outstanding specimens in some of the most impossible situations where only weedy species can exist.

This is not a good shade tree but in the home grounds the dark green leaf with the shape of the leaflets of Maidenhair fern is attractive, and the height can be used to good landscape effect.

ELDRED E. GREEN.

For the End of the Year

As the evergreens begin to take their special place in the autumn landscape, a place that is even lovelier than that which they will take over later in mid-winter, one is often struck with the thought that leaves on evergreens have their life span just as do the deciduous leaves that are falling to make the new brown cover for the woodland floor. *Rhododendron Fortunei* hidden in a bower of Kurume azaleas to safeguard its first years, is dropping the leaves that were formed last year, while those of *R. maximum* or even those of the small *R. ovatum* seem to have a longer span. One wonders how long it must be before the framework of Fortune's rhododendron will bend down and cover the bare skeleton that is forming with each year's new growth.

The azaleas are loosing their lush leaves of summer growth, keeping only those that lead up to the fat buds that promise flowers for the New Year ahead. *R. poukhanense* is quite bare but Kaempfer's still wears almost its full quota. *R. mucronatum* and its several forms are duller than in summer but the leaves still hold. The Kurumes show signs of autumn color on the old leaves but not enough have fallen, even on plants of such as Hinomayo, to suggest that they will be less lush by Spring. Only the true *R. indicum*, still better known as *Azalea macrantha*, holds all its load of shining leaves untouched as yet by the bronze and red purple which will tint them later on. *R. reticulatum* is beginning to show the bronze that will turn to dull red before all fall, but the as yet tiny plants of *R. Tschonoskii* which are supposed to turn fine colors maintain the dull green of the summer months.

Nearby, growing on the oaks, the various ivies are preparing for the winter, slowed up after their autumn burst of growth, but no signs of pink have appeared as yet on the white margins of the variegated sorts. The lovely almost white tips of *marmorata* stand out clearly against the gray of oak bark, and the clearly edged leaves of *rhomboidea variegata* make a delicate tracery on the darker trunk of the red oak that bears them up. Elsewhere the growths that were made in the end of summer show the length of that growth by their smaller sizes, and one reminds himself that next year, without fail, he must watch to see if when they begin to grow again they make a normal sized adult leaf. Or do they?

Magnolia grandiflora, beautiful enough at any time, stands in full beauty with no leaves falling, and one recalls that the leaf fall here is especially in June, while its other Southern neighbor, *M. virginiana*, is losing its leaves

slowly now, as the prelude for complete drop before the winter is over, quite the contrary of its appearance in the deep South.

In contrast the Japanese *Styrax obassia* is almost bare, the ground beneath it littered with its large leaves that make the annual task of seed gathering a squirrel-like business of tossing them about while one hunts for the seeds that look so much like roasted coffee beans. The smooth-barked trunks remind one of the polished wood one sees in Japanese houses, polished, so one is told, only by rubbing with the human hand.

This business of gathering seeds from one's trees and shrubs for sending hither and yon is something of which we should do more, and any one who would like a few seeds this year or next need only write the editor. His trees came from one that once grew in Dr. Fairchild's Maryland home and have in turn been sent as seed to other gardens. One need only plant the seed out of doors in the autumn and wait the germination in the Spring. After the first two years growth is very rapid. How far north it will be hardy is not known but it could be tried like any other garden adventure.

Plant Exchange belongs to all good gardening and last Spring at the urgent behest of one member we tried to start such a column. How much came of it we shall never know, but requests did not continue to come in and so it failed after the April issue. Should it not be tried again?

The time of leaf fall is also the best time in the garden to plan the orders for shrubs and trees that may be needed just as it is also the best time to decide which must come out.

And when one is planning, one's imagination can run on and on, as it does for the editor who is a gardener

like any one else, save that he plans not only for his own garden but for the Magazine, thinking always in terms of what might be on hand against some future use as copy or as photograph.

Although for him it is a more or less purposeful, perhaps even selfish, planning, if the system could be extended to all members who would plan to have some new things each year about which they could then write in for the delectation of the rest, the Magazine would be even richer than it now is in the plant material notes that have made it quite famous in its way. What are you doing that should be reported? It may seem slight to you, but what chance reference has opened new vistas to you? What of the revival in geraniums? What of camellias? To name but two quite different plants.

Who has grown all the new named races of scabiosas? Are Drummond's phloxes once more coming into a renewed value after the war years when

we so often had only mixtures? Are the Chinese pinks once more coming into a period of refinement so that we could offer as many patterns as once made them almost collectors' items? Will there be more and more morning glories to compete with those already named? What of border carnations, which are having a revival in the Pacific Coast regions? Who will risk the onerous first years of working to fix endless strains of Violas, of which we grow few as compared with Europe? Will the fine strains of Polyanthus Primroses from the Coast come East again? So one might go on and on.

We are coming to the end of another year, the end of Volume 25 for the Magazine in which were published many things as planned but from which many things were missing. Next year lies ahead and in coming to a new quarter century, we look forward with that eagerness and anticipation that seems peculiar to gardeners.

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